

MANUAL FOR OPERATION & MAINTENANCE OF TWIN ALTERNATING WATER SOFTENER

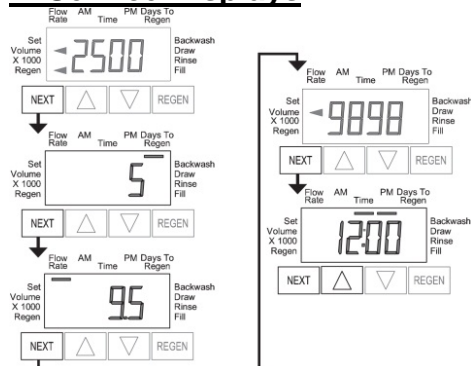


for Models:

W-S3072EMT & W-S3672EMT

PANEL OPERATION QUICK REFERENCE GUIDE

In Service Displays

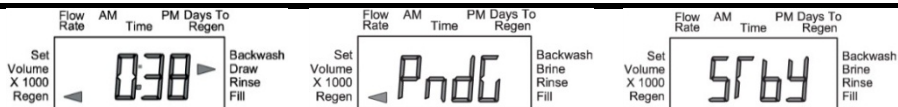


When the valve is in service, one of five displays may be shown.

Pressing NEXT will alternate between displays.

- **User Screen 1:** Typical user display. Shows volume remaining (in gallons) until next regeneration.
- **User Screen 2:** Displays number of days to next regeneration.
- **User Screen 3:** Displays flow rate in gallons per minute.
- **User Screen 4:** Displays total flow in gallons since last reset. (Press and hold ▼ for 3 seconds to reset to 0.)
- **User Screen 5:** Shows current time.

Regeneration & Standby Screens

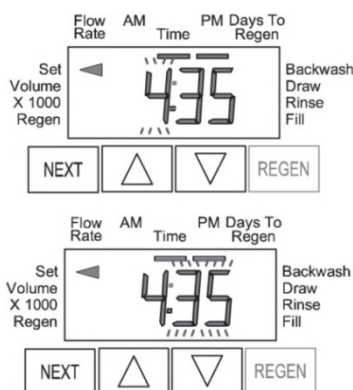


- During Regeneration: The display shows the time remaining in the current cycle. Pressing "REGEN" will advance to the next cycle.
- REGEN PndG" is displayed when the unit is waiting to imitate the first cycle step of regeneration.
- "STbY" is displayed in Alternator Systems when a valve is in Standby state.

Set Time of Day

In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right.

(Time of day will only need to be set when a power outage lasts more than 8 hours, or when daylight savings time begins or ends.)



- Press NEXT until the time of day screen is displayed.
- Press and hold ▲ or ▼ until the SET indicator is displayed and the hour flashes.
- Press ▲ or ▼ until the correct hour is displayed.
- Press NEXT, the minutes will flash.
- Press ▲ or ▼ until the correct minute is displayed.
- Press NEXT to return to the display screen.

Button Operation and Function

NEXT

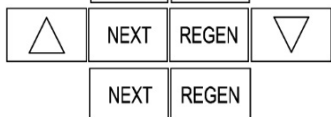
Scrolls to the Next Display

REGEN

- Press once and release to schedule a regeneration at the preset delayed regeneration time. (Press and release again to cancel the regeneration.)
- Press and Hold for 3 seconds to initiate an immediate regeneration.
- **While Regeneration is in Process:** Press to advance to the next cycle.
- **While in Programming Screens:** Press to go backwards to the previous screen.



Changes variable being displayed.



Key sequence to lock and unlock program settings.

Press and Hold for 3 seconds to initiate a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve.

Error Message

If the word "ERROR" and a number are flashing on the display, check the trouble shooting section of this manual to identify the error. Clear error by disconnecting the power supply at the PC board and reconnecting, or press the NEXT & REGEN buttons simultaneously for 3 seconds.

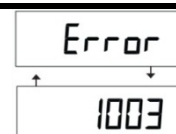


TABLE OF CONTENTS

Design Basis & Specifications	4
General Information and Safety	4
Installation	4
Location	4
Loading the Media	5
Resin and Media Quantity per Model	5
Plumbing	6
Valve Wiring	8
Initial Start-Up	10
System Monitoring and Record Keeping	11
Operating Conditions	11
Operating Do's and Don'ts	11
Control Valve Operation & Service	12
Control Valve Specifications	12
In Service Displays	13
Regeneration & Standby Screens	13
Set Time of Day	13
Button Operation and Function	13
Error Message	13
General Warnings & Site Requirements	14
Control Valve General Features and Information	14
Configuring and Programming Control Valve Options	14
Twin Alternating Softener Recommended Programming Overview	15
Configuration Settings (Pre-Programmed to Factory Defaults)	16
Regeneration Cycle Time Settings (Pre-Programmed to Factory Defaults)	18
Installer Displays and Settings for Control Valve Options	19
Diagnostics	19
Control Valve Drawings and Components	20
CV2 Overview Drawings	20
CV2 Drive Cap Assembly, Downflow Piston, Regenerate Piston & Spacer Stack Assembly	21
CV2 Injector Valve Body, Refill Flow Control and Injector Plug	22
CV2 Drain Line Flow Controls	23
Meter Assembly	24
Motorized Alternating Valve	25
CV2 Flow Diagram, Service	26
CV2 Flow Diagram, Backwash	26
CV2 Flow Diagram, Draw	27
CV2 Flow Diagram, Rinse	27
CV2 Flow Diagram, Treated Water Refill	28
Service Spanner Wrench	28
Control Valve Service Instructions	29
Drive Assembly	29
Drive Cap Assembly	30
Main Piston and Regenerant Piston	30
Spacer Stack Assembly	30
Injector Cap, Screen, and Injector	31
Refill Flow Control Assembly	31
Drain Line Flow Control	31
Meter Assembly Service Instructions	31
Motorized Alternating Valve (MAV) Service & Installation Details	32
Maintenance – Removal & Replacement of Softening Resin	33
Troubleshooting	34
Product Warranty	40

DESIGN BASIS & SPECIFICATIONS

Table 1 – Design Basis

Model No.*	Flow Rate** (GPM)		Backwash Flow** (GPM)	Volume of Resin (Cu. Ft.)				Resin Tank (2) (Dia"×H")	Brine Tank (Dia"×H")	Valve & In/Out Conn.
	5gpm per ft²	15gpm per ft²		Softening Resin (Only)		Total (Incl. Underbed)				
			Per Tank	Total	Per Tank	Total				
W-S3072EMT	24	74	25	12.5	25.0	16.5	33.0	30×72	39×48	2"
W-S3672EMT	35	95	35	17.0	34.0	22.0	44.0	36×72	39×60	2"

* Softeners are available with USA or European style plugs and voltages.

• W-S3072EMT-US & W-S3672EMT-US = 120V AC/60Hz with USA cord

• W-S3072EMT-EU & W-S3672EMT-EU = European 220V AC (EU plug is removable to convert into universal 220v cord)

** Backwash flow rate based on 25 psi pressure drop.

Operating Limits: Vessel rated at 150 psi max. operating pressure, 120°F max. operating temp.

GENERAL INFORMATION AND SAFETY

DISCLAIMER:

The information contained in this document is subject to change without notice. Applied Membranes, Inc. shall not be liable for technical or editorial omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

READ THIS MANUAL:

Prior to operating or servicing this unit, this manual must be read and understood. If anything is not clear, call for assistance before proceeding. Keep this and other associated manuals for future reference and for new operators or qualified service personnel.

USE PROPER POWER CONNECTIONS:

Use proper wiring and connection methods to satisfy local electrical codes. **SHOCK HAZARD:** Connect this unit to a properly grounded connection in accordance with the National Electrical Code. **DO NOT**, under any circumstances, remove the ground wire or ground prong from any power plug. Do not use extension cords or an adapter without proper consideration.



SERVICE WARNING:

To prevent electrical shock, disconnect power to the system prior to servicing.



WARNING:

Do not make any alteration or modification in the wiring or plumbing of the system. This can result in damage to the system and cause injury to operators or users.



WARNING:

Flush the system for at least 30 minutes before use to remove all chemicals present.



CAUTION:

Never let the water softener freeze. Freezing can damage the resin tank.

INSTALLATION

Unpack the water softener. Inspect assemblies for damage (cracked couplings, broken or split pipes, loose straps, etc.).

LOCATION

Select a location for the water softener with adequate clearance from walls and other equipment to allow access on all sides of the tank. The unit must be located near a drain able to accommodate the backwash flow rate of your unit (see Table 1 – Design Basis). This is in addition to any other equipment sharing the drain.

Select a location for the brine tank that is accessible for easy refilling. Ensure floor beneath the brine tank is clean and level.

A grounded power supply of the appropriate voltage and a local disconnect switch is required.



Caution: The unit must not be located near any corrosive chemicals, or in an area where the temperature may exceed 113°F (45°C). Do not install any water conditioner with less than 10 feet of piping between its outlet and the inlet of a water heater.



Warning: The power supply must be properly grounded to avoid injury from electrical shock.

LOADING THE MEDIA

1. Place each resin tank on a level, solid surface in the correct position for installation, taking note of correct ALT A and ALT B tank positions. (Refer to drawing on next page.) Lift the riser tube from the tank, keeping the attached hub within the opening of the tank. Within the tank, assemble the laterals onto the hub, twisting each lateral into the hub to lock securely. Gently lower the assembly to the bottom of the tank. The top of the riser tube should be about level with the top of the tank.
2. The “riser tube” inside the media/resin tank delivers treated water to your control valve. It will need to be temporarily covered with tape on the top end to prevent anything from falling down inside the tube during loading.
3. Step back and look at each tank to make sure it is standing straight, and not tilted. The black base on the bottom of the tank should also be straightened before filling the tank. If your tank is tilted, simply pick up the tank 2-3 inches off the floor and drop it gently (but firmly) down, favoring the side of the base that needs to be adjusted.
4. Before loading the media, fill each tank with 2-3 feet of water (or 1/3 full, depending on the tank size), to soften the fall of the rocks and prevent damage to the distributor. To load the media, use a funnel in the top of the media tank with the riser tube still inside. Make sure the riser tube is covered with tape to keep media out.
5. Scoop the media into the funnel, slowly letting it fall down inside the media tank around the riser tube. Fill the tank with the media provided, pouring the media in the following order (1stst will end up on the bottom of the tank, last will end up at the top of the tank, etc.). *Note: The tank will be approximately ½ - ¾ full after loading is complete. Refer to Table 2 for the proper quantities of each media.*
 - I. Gravel – YMGRVL11618 – 1 CF (100 lbs.) per bag
 - II. Gravel ¼” x ⅛” – YMGRVL1418 – 0.5 CF (50 lbs) per bag
 - III. Resin – CGS – 1 CF (50 lbs) per bag
6. Remove the funnel from the top of the tank, and the tape from the end of the riser tube. Brush any loose media or resin off the top opening of the tank.



7. The bottom of the control valve has an opening with O-rings inside; lubricate the O-ring with a non-petroleum based lubricant. Position the valve over the top of the media tank, making sure the top of the riser tube inserts inside the opening in the bottom of the valve.
8. Screw the valve down into the media tank. Another person should hold the tank as the valve is being snugly tightened onto the tank. **Do not over-tighten.** Tighten until snug, tighten a bit more, then STOP. The large o-ring will seal itself.

RESIN AND MEDIA QUANTITY PER MODEL

Table 2 – Resin and Media Quantities – QTY PER TANK

Model No.* (-US or -EU)	Gravel (per tank) 1/16 x 1/8 I	Gravel (per tank) 1/4 x 1/8 II	Softening resin (per tank) III
W-S3072EMT	2 CF (200 lbs)	2 CF (200 lbs)	12.5 CF (638 lbs)
W-S3672EMT	3 CF (300 lbs)	2 CF (200 lbs)	17.0 CF (867 lbs)

PLUMBING

⚠ Note: All plumbing is to be done in accordance with state and local codes.

⚠ Caution: Before placing wall anchors to support piping ensure that no electrical conduit or wiring is located behind the intended mounting location.

⚠ Note: The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

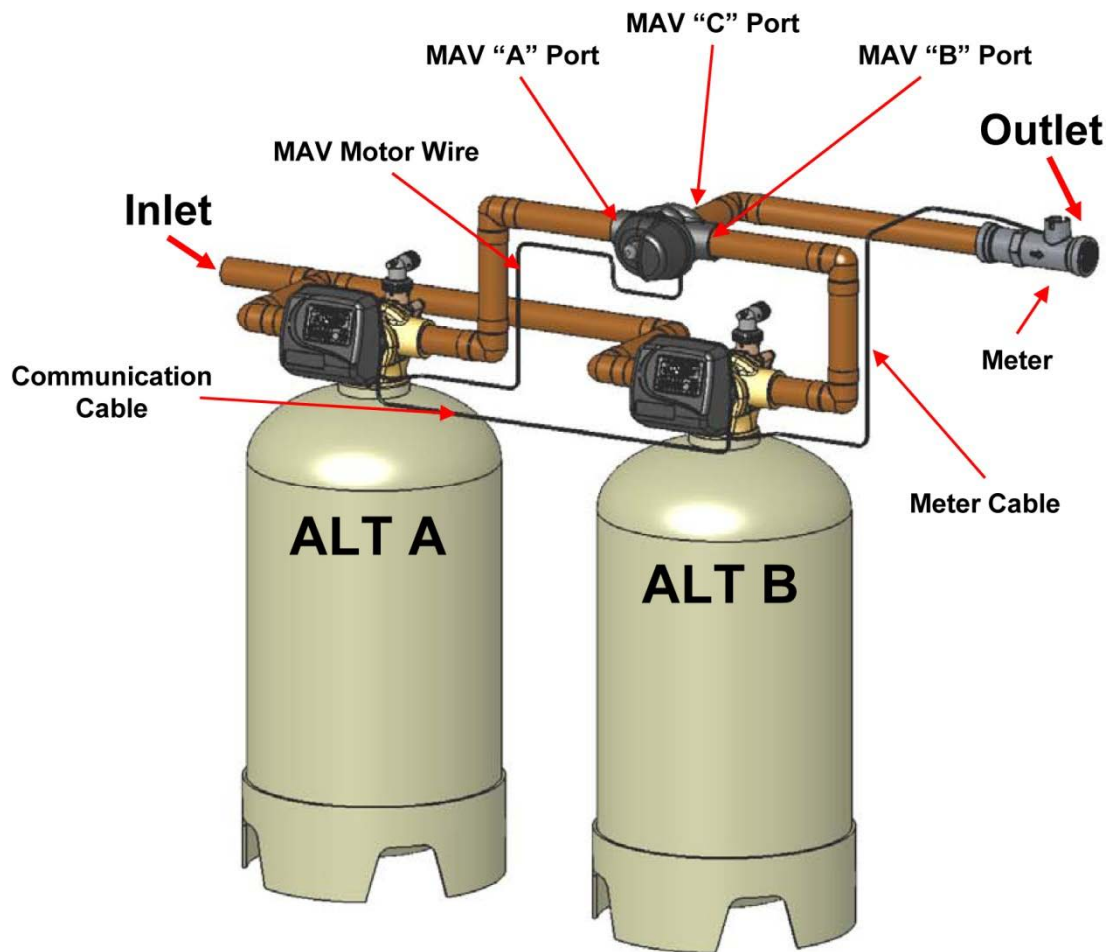
⚠ Note: Connect to a supply line downstream of outdoor spigots. Install an inlet shutoff valve and plumb them to the unit's inlet. Installation of a bypass valve is recommended. If using plastic fittings, ground the water conditioner per local electrical codes.

⚠ Note: Do not use pipe dope or other sealant on threads. Use teflon tape on threaded inlet, outlet and drain fittings.

1. Plumb the Motorized Alternating Valve (MAV) according to the photos/drawings.

Note: Ensure that the valve labeled "Alt A" is connected to the "A" port on the MAV, and the valve labeled "Alt B" is connected to the "B" port.

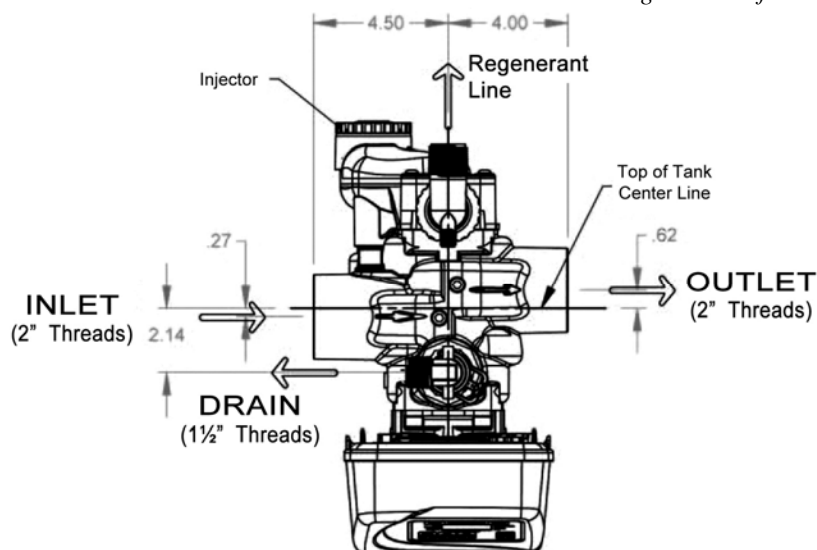
For MAV installation details and installation options, see "Motorized Alternating Valve (MAV) Service & Installation Details" section in the "Control Valve Service Instructions" section of this manual.



1. **Install connecting piping between raw water source and input pipe on control valve.**

2. **Install drain line from control valve to a free flowing drain.**

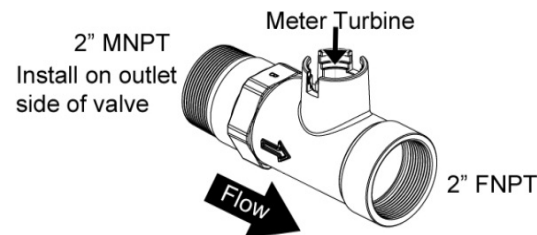
Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" (152.4mm) between the drain line flow control fitting and the solder joints to prevent heat from damaging the flow control. Avoid elevating the drain line above the control valve where possible. Discharge the drain line through an air gap to a receptacle in accordance with local plumbing codes.



⚠ Important: Never insert a drain line directly into a drain, sewer line or trap. Always allow an air gap between the drain line and the receptacle to prevent back siphonage.

3. **Install the water meter on the outlet side of the control valve.**

The meter may be threaded directly into the valve or may be plumbed separately downstream of the unit*. Ensure the arrow on the meter body is going the same direction as the water flow. The turbine assembly may be oriented in any direction, but is usually oriented pointing up to reduce drainage out of the pipe during service. Meter can be installed horizontally or vertically.



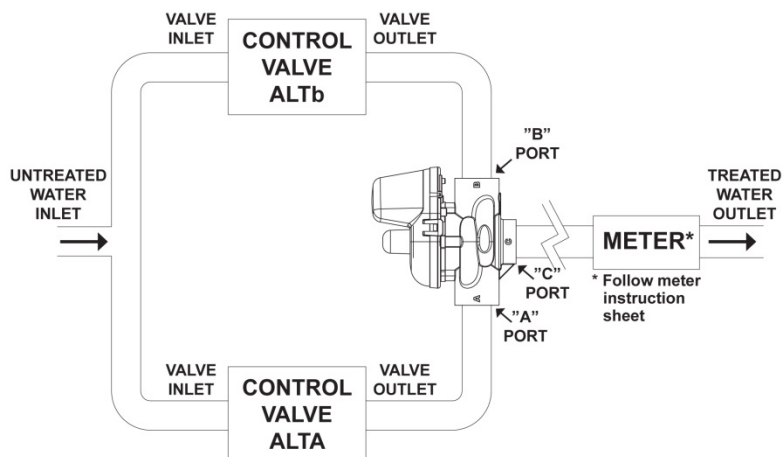
4. **Install piping between meter output and point of use.**

5. **Install Brine/Refill line between brine tank and regnerant line.**

To complete the regnerant line connection, orientate the outlet in the desired direction and push the plastic insert into the polytube. Push the polytube into the nut. Do not use pipe dope or other sealants on threads. The threads for the compression nut do not need Teflon tape. Tighten the nut securely to create a pressure tight connection. A pliers or crescent wrench may be used to tighten or unscrew the nut. The nut, gripper and retainer sleeve is a 3 piece assembly that can come apart if removed from the elbow body. Parts must be reassembled exactly as shown in refill flow control assembly drawing to function properly. If the nut is completely removed from the body, slip the nut, plastic gripper and retainer sleeve on to the tube then tighten on to the fitting.

6. **Install an overflow drain line from the regnerant tank.**

Connect a line to the 1" overflow fitting on the regnerant tank. Do not elevate the overflow drain line. Discharge the overflow drain line through an air gap to a receptacle in accordance with local plumbing codes.

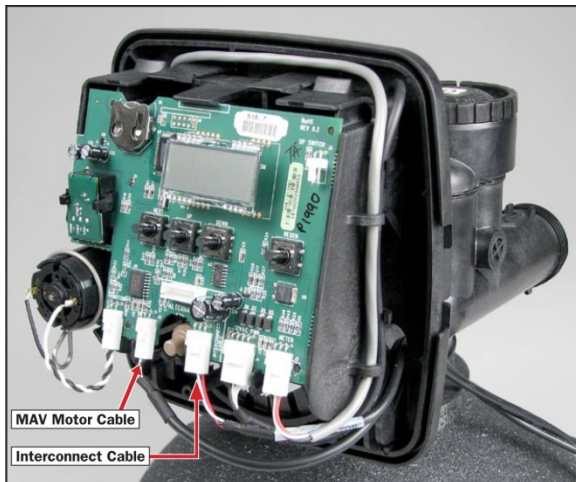
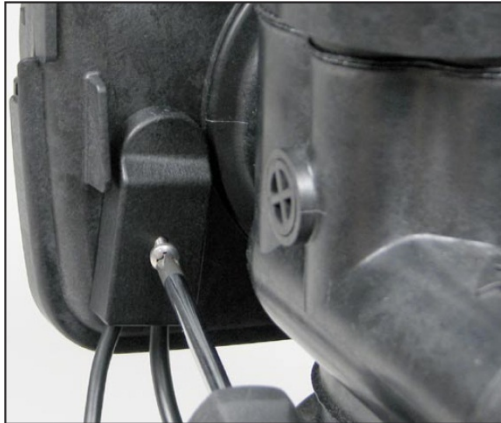


VALVE WIRING

1. Connect MAV Motor Wire & Interconnect cable to valve head Alt A:

- On the backside of the valve, remove the strain relief cover with a screwdriver.
- Remove the cover of the valve by pulling out on the release tabs located on each side of the cover.
- Feed the MAV motor wire and interconnect (communication) cable through the hole in the back of the valve.
- Connect the MAV motor wire to the two pin connector labeled "DRIVE" on the PC Board.
- Connect the interconnect (communication) cable to the three pin connector labelled "INTERCONNECT CABLE" on the PC Board.
- After connecting the cables, weave the wires through the strain relief on the backside of the valve, and replace the strain relief cover and screw. Replace the valve cover

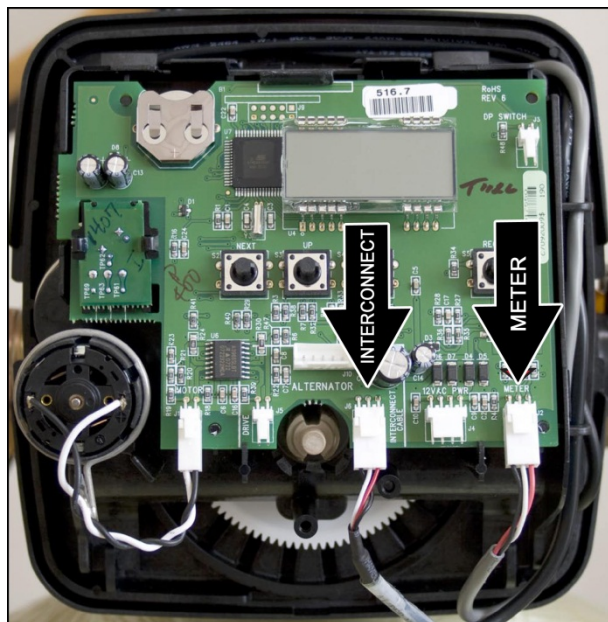
Alt A Wire Connections



2. Connect MAV Cables to valve head Alt B:

- On the backside of the valve, remove the strain relief cover with a screwdriver.
- Remove the cover of the valve by pulling out on the release tabs located on each side of the cover.
- Feed the other end of the interconnect (communication) cable & the meter cable through the hole in the back of the valve.
- Connect the interconnect cable to the three pin connector labelled “INTERCONNECT CABLE” on the PC Board.
- After connecting the cables, weave the wires through the strain relief on the backside of the valve, and replace the strain relief cover and screw. Replace the valve cover.
- Ensure meter cable is connected to the meter assembly. See “Meter Service Instructions” in the “Control Valve Service Instructions” section of this manual for detailed meter disassembly and reassembly instructions.

Alt B Wire Connections



INITIAL START-UP

1. Check all piping connections and make sure feed valves are open. Inspect plumbing for leaks.
2. Check that control valve is connected to electrical source.
3. Open Raw Water source valve.

Note: Check for leaks throughout system as pressure is applied.

Note: For detailed information on the control valve operation section of this document.

4. Fully open a cold water faucet downstream of the system. Allow water to run until clear. Close the cold water faucet.
5. Turn of the supply water.
6. Manually pour enough water into the regenerant tank to reach the top of the air check valve.
7. Initiate manual regeneration of the control valve: Press and hold the REGEN button for three seconds until the drive motor starts. Press the REGEN button to advance the unit into the backwash cycle. Wait until the motor stops and the backwash time begins to count down.
8. Open the inlet water supply valve very slowly, allowing the water to fill the tank in order to expel air.



Caution: If water flows too rapidly, there will be a loss of media out the drain.

9. When water is flowing steadily to the drain without the presence of air, press the REGEN button again to advance the control to the brine position. Wait until the motor stops and the brine time begins to count down.
10. Fully open the water supply inlet valve. Check that water is being drawn from the regenerant tank & there should be a slow flow to the drain. Allow three minutes for the media bed to settle.
11. Press the REGEN button to advance the unit to the rinse position. Allow water to run to drain for 2 to 3 minutes, or until the drain runs clear.
12. Press the REGEN button to advance to the fill position. Allow the regenerant tank to fill automatically. Systems with a salt grid should see a water level 1 ½" to 2" above the grid.
13. Fill brine tank with salt. Salt may be sodium chloride (NaCl) or potassium chloride (KCl). Fill tank to only 2/3 full.
NOTE: The brine tank holds a large quantity of salt, so you will not need to refill at frequent intervals. Refilling the brine tank with salt should be performed after your system is successfully installed and has been operating trouble-free. Brine tank should be refilled with salt at least 2 hours before the next generation is performed.
14. Before placing valve into service, perform a full manual regeneration cycle by pressing and holding the REGEN button for three seconds until the drive motor starts. (Ensure salt has had ample time to dissolve.)
15. Review the control valve operations section of this manual and ensure settings are properly programmed before placing the water softener in service.

SYSTEM MONITORING AND RECORD KEEPING

Monitor water softener and record all pertinent data. This data is needed to determine operating efficiency and for performing system maintenance. *The latter includes changing of the media, pressure drop across the mineral tank and control valve.*

Note: *Warranty Claims cannot be processed without adequate operating data and water softener history.*

OPERATING CONDITIONS

For optimum water softener performance, observe the following:

- Maintain a minimum of 25 psi during backwash cycle.
- Water pressure should not exceed 120 psi across mineral tank.
- Water temperature should not exceed 110 °F.



CAUTION: *Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain o-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.*

OPERATING DO'S AND DON'TS

DO:

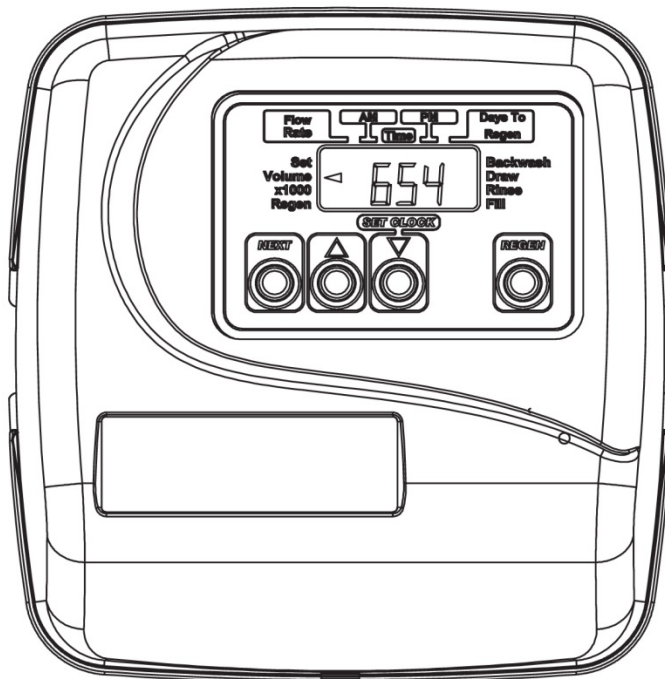
- Monitor system and keep a log.
- Maintain proper water pressure for backwashing.

DON'T:

- Permit oils or fats in feed water.
- Shut down system for extended periods.
- Exceed operating pressures or temperatures.
- Backwash filter with insufficient water flow.

CONTROL VALVE OPERATION & SERVICE

CV2 CONTROL VALVE

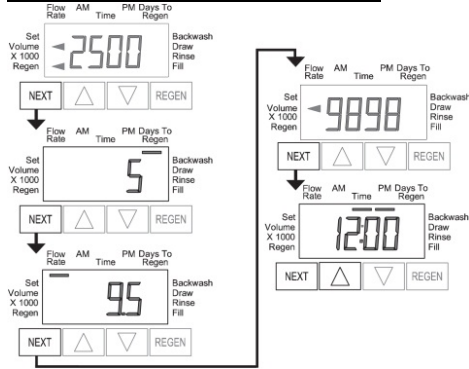


CONTROL VALVE SPECIFICATIONS

- | | |
|---|---|
| • Minimum/Maximum Operating Pressures: | 20 psi (138 kPa, 1.4 bar) to 125 psi (862 kPa, 8.6 bar) |
| • Minimum/Maximum Operating Temperatures: | 40°F (4°C) to 110°F (43°C) |

⚠ No user serviceable parts are on the PC board, the motor, or the power adapter. The means of disconnection from the main power supply is by unplugging the power adapter from the wall.

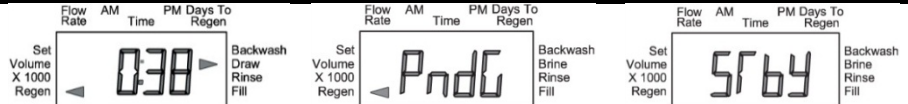
IN SERVICE DISPLAYS



When the valve is in service, one of five displays may be shown. Pressing NEXT will alternate between displays.

- **User Screen 1:** Typical user display. Shows volume remaining (in gallons) until next regeneration.
- **User Screen 2:** Displays number of days to next regeneration.
- **User Screen 3:** Displays flow rate in gallons per minute.
- **User Screen 4:** Displays total flow in gallons since last reset. (Press and hold ▼ for 3 seconds to reset to 0.)
- **User Screen 5:** Shows current time.

REGENERATION & STANDBY SCREENS

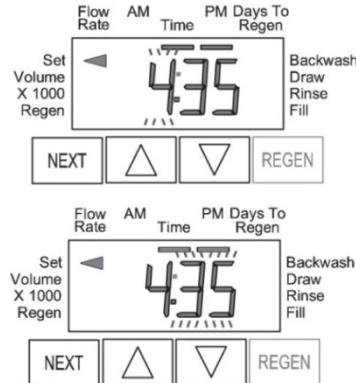


- During Regeneration: The display shows the time remaining in the current cycle. Pressing “REGEN” will advance to the next cycle.
- REGEN PndG” is displayed when the unit is waiting to imitate the first cycle step of regeneration.
- “STbY” is displayed in Alternator Systems when a valve is in Standby state.

SET TIME OF DAY

In the event of a prolonged power outage, time of day flashes, indicating that it needs to be reset. All other information will be stored in memory no matter how long the power outage. Please complete the steps as shown to the right.

(Time of day will only need to be set when a power outage lasts more than 8 hours, or when daylight savings time begins or ends.)



- Press NEXT until the time of day screen is displayed.
- Press and hold ▲ or ▼ until the SET indicator is displayed and the hour flashes.
- Press ▲ or ▼ until the correct hour is displayed.
- Press NEXT, the minutes will flash.
- Press ▲ or ▼ until the correct minute is displayed.
- Press NEXT to return to the display screen.

BUTTON OPERATION AND FUNCTION

NEXT

Scrolls to the Next Display

REGEN

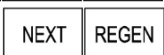
- Press once and release to schedule a regeneration at the preset delayed regeneration time. (Press and release again to cancel the regeneration.)
- Press and Hold for 3 seconds to initiate an immediate regeneration.
- **While Regeneration is in Process:** Press to advance to the next cycle.
- **While in Programming Screens:** Press to go backwards to the previous screen.



Changes variable being displayed.



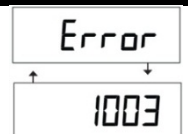
Key sequence to lock and unlock program settings.



Press and Hold for 3 seconds to initiate a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve.

ERROR MESSAGE

If the word “ERROR” and a number are flashing on the display, check the trouble shooting section of this manual to identify the error. Clear error by disconnecting the power supply at the PC board and reconnecting, or press the NEXT & REGEN buttons simultaneously for 3 seconds.



GENERAL WARNINGS & SITE REQUIREMENTS

▲ The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

▲ Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on black o-rings but is not necessary

▲ Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain o-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. Do not use the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.

▲ Teflon tape is recommended to be used on all threads. Do not use pipe dope, as it may break down the plastics in the control valves.

▲ The plug in power adapter is for dry locations only, and should be connected to an uninterrupted outlet installed within 15 feet (4.57 meters) of the water conditioner.

▲ All plumbing should be done in accordance with local plumbing codes.

▲ Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.

▲ Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.) Install grounding strap on metal pipes.

▲ After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for 3 seconds. The cover button may have other names like "SET HOUR", "CLOCK" or "SET CLOCK" but the circuit board is labeled with SET. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

CONTROL VALVE GENERAL FEATURES AND INFORMATION

This fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a downflow regeneration water softener. The control valve included with this system is equipped with a meter and can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days).

The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing, and the replenishing of treated water into a regenerant tank.

The control valve uses no traditional fasteners (e.g. screws); instead clips, threaded caps and nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screw driver, one large blade screw driver, pliers and a pair of hands. A plastic wrench is available which eliminates the need for screwdrivers and pliers. Disassembly for servicing takes much less time than comparable products currently on the market. Control valve installation is made easy because the distributor tube can be cut ½" above to ½" below the top of tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

The AC adapter comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter is for dry location use only. The control valve maintains timekeeping for up to 8 hours if the power goes out and the battery is not depleted. After 8 hours, the only item that needs to be reset is the time of day; valve status and programming are permanently stored in the nonvolatile memory. If a power loss lasts less than 8 hours and the time flashes on and off, the time of day should be reset and the non-rechargeable battery should be replaced.

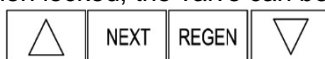
CONFIGURING AND PROGRAMMING CONTROL VALVE OPTIONS

The control valve offers multiple procedures that allow the valve to be modified to suit the needs of the installation.

- User Displays
- Configuration Settings
- Cycle Times Settings (for Regeneration)
- Installer Display Settings
- Diagnostics

These procedures can be accessed in any order. Details on each of the procedures are provided below and on the following pages.

At the discretion of the installer, the end user can access all settings. To "lock out" access to programming settings, press the key sequence: ▲, NEXT, REGEN, ▼. When locked, the valve can be unlocked by pressing the same key sequence.



TWIN ALTERNATING SOFTENER RECOMMENDED PROGRAMMING OVERVIEW

Table 3 – Valve Programming Steps for Recommended Default Program

Valve Programming Section (See following pages)		“ALT A” Valve Setting	“ALT B” Valve Setting
Configuration Settings			
• Valve Size	Step 2CS	2.0	2.0
•	Step 3CS	FL2.0	FL2.0
• Regeneration Type	Step 4CS	◀ Volume (no # in display)	◀ Volume (no # in display)
• Regeneration Timing	Step 5CS	on 0	on 0
• Twin Alternating Configuration	Step 6CS	ALTA	ALTb
• Set Pre-Service Rinse Time	Step 7CS	5	5
• Pressure Differential Option	Step 8CS	oFF	oFF
Installer Setup			
• Softening Capacity Between Regeneration	Step 2I	Enter Volume Capacity (See Table 4)	Enter Volume Capacity (Same as Valve A)
• Days Override Option	Step 3I	oFF	oFF
Regeneration Cycle Times Settings			
• Softener or Filter Setup	Step 2CT	SOFTENING	SOFTENING
• Backwash Length	Step 3CT	8	8
• Regenerant Draw Length	Step 4CT	60	60
• Second Backwash Length	Step 5CT	8	8
• Rinse Length	Step 6CT	4	4
• Regenerant Refill Length	Step 7CT	See Table 4	Same as Valve A

Table 4 – Salt Usage and Grains Capacity Settings

The softener can be set to use different amounts of salt per regeneration. The higher the quantity of salt used, the higher the resin's hardness removing capacity will be. **AMI recommends using 10 lbs/cu.ft. setting.** Alternatively, higher salt usage may be set in order to maximize resin capacity between regenerations, or a lower salt usage settings can be used to reduce salt consumption, but this will result in more frequent regeneration. This data is also shown below.

- To find Volume Capacity (for Estimating Step 2I^d) :
 - Find your model and desired salt setting from the below table (10 lbs/cu.ft. recommended) to find the total GRAINS capacity for your model.
 - Divide the grains capacity by the number of grains per gallon of hardness present in the feed water.
(Example: If feed water is 10 grains per gallon hardness, the W-S3072EMT (with 10lbs /cu.ft. salt setting) has 362,500 grains capacity (per tank). $362,500 \div 10 = 36,250$ gallon capacity. Enter “36250” in step 2I^d.
- To find Brine Fill Time (for Step 7CT): Use number from “Brine Fill Time” column for your model in the appropriate salt settings column.

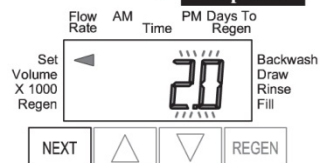
Softener Model Number (Volume of Softening Resin)	Capacity (per tank) at Various Lbs of Salt per Regeneration Settings											
	15 lbs/cu.ft.			10 lbs/cu.ft. (Recommended)			7.5 lbs/cu.ft.			5 lbs/cu.ft.		
	Grains Capacity	Salt Used per Regen	Brine Fill Time (minutes)	Grains Capacity	Salt Used per Regen	Brine Fill Time (minutes)	Grains Capacity	Salt Used per Regen	Brine Fill Time (minutes)	Grains Capacity	Salt Used per Regen	Brine Fill Time (minutes)
W-S3072EMT (12.5 cf)	412,500	188 lbs	28.5	362,500	125 lbs	18.9	317,000	94 lbs	14.2	250,000	63 lbs	9.5
W-S3672EMT (17.0 cf)	561,000	255 lbs	38.6	493,000	170 lbs	25.8	431,800	128 lbs	19.4	340,000	85 lbs	12.9

CONFIGURATION SETTINGS (PRE-PROGRAMMED TO FACTORY DEFAULTS)

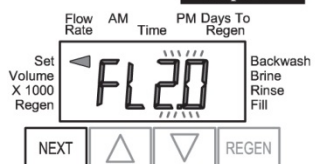
Step 1CS



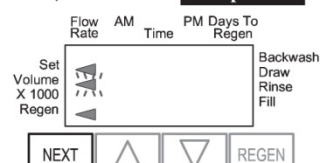
Step 2CS



Step 3CS



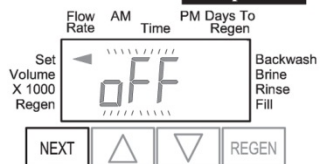
Step 4CS



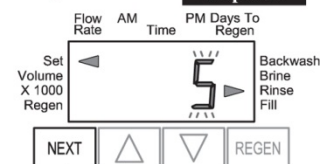
Step 5CS



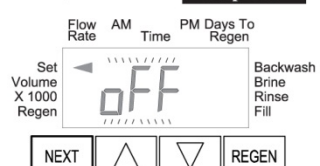
Step 6CS



Step 7CS



Step 8CS



EXIT TO
DISPLAY
SCREENS

Step 1CS

Press ▲ and ▼ simultaneously for 5 seconds and release. If screen in Step 2CS does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲ and ▼ simultaneously for 5 seconds and release.

Step 2CS

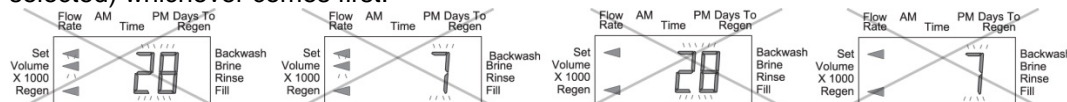
Choose 1.5 (for 1.5" valve). Press NEXT to go to Step 3CS.

Press REGEN to exit Configuration Settings.

(Note: If 2.0L or 2.0 are selected an additional flow meter screen (not shown) will appear which does not apply to the configuration of this softener. If 2.0L or 2.0 is accidentally selected, press REGEN to return to step 2CS and select 1.0.)

Step 4CS

"Volume" arrow (with a blank number display) should be selected for twin softeners. If a different display (listed below) is shown, press the ▲ or ▼ buttons to scroll through the options until the correct display is shown. When Volume (gallons) is selected the regeneration will occur after the specific volume has been used or on the day override (if selected) whichever comes first.



Press NEXT to go to Step 5CS. Press REGEN to return to previous step.

Step 5CS

Press ▲ or ▼ to select to regenerate immediately on 0 (recommended for twin softeners) or at delayed time (not recommended).

Note: If immediately on 0 option is not available, the wrong setting was selected in step 4CS. Press REGEN to return to step 4CS and correct the setting to "Volume".

Press NEXT to go to Step 6CS. Press REGEN to return to previous step.

Step 6CS

Press ▲ or ▼ to select "ALT" option.

"Alt A" Valve should be marked "ALTA"; "Alt B" Valve should be marked "ALTB"

Note: Check that the Alt A and Alt B Valves are connected to the proper connection points on the MAV as per the instructions in the Plumbing section of this manual.

Press NEXT to go to Step 7CS. Press REGEN to return to previous step.

Step 6CS

Press ▲ or ▼ to set rinse and fill delay to "OFF".

(Note: Rinse and fill delays may be required in applications where a hardness meter is installed downstream. This would eliminate any potential spikes when the tanks switch from standby to operation which could trigger the hardness monitor to shut down the system. For normal operation, it is recommended this feature be set to "OFF")

Press NEXT to go to Step 7CS. Press REGEN to return to previous step.

Step 7CS

Press ▲ or ▼ to set pre-service rinse time to "5".

Press NEXT to go to Step 8CS. Press REGEN to return to previous step.

Step 8CS

Press ▲ or ▼ to set external pressure differential option to "OFF".

(If dP is present and is the desired trigger for regeneration, choose from "on0", "dELY", or "HoLd". See detailed instructions on the following page.)

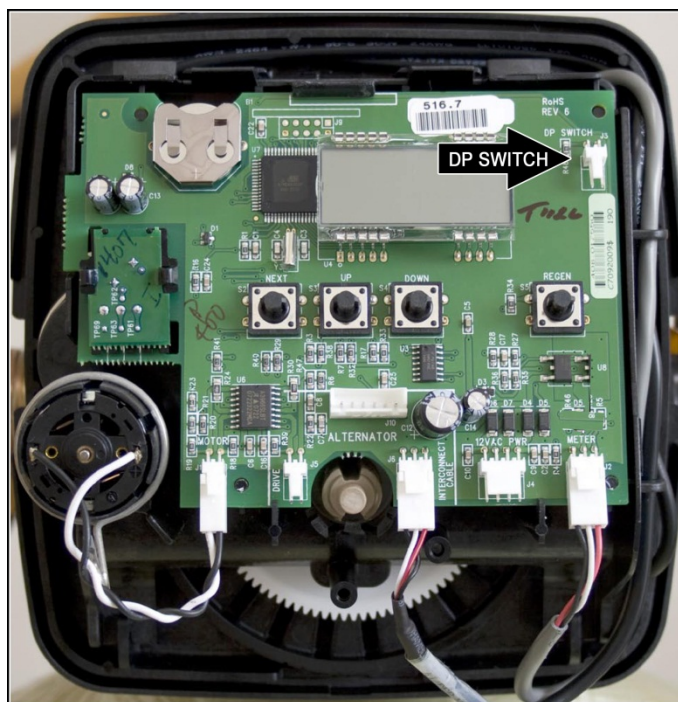
Press NEXT to exit configuration settings. Press REGEN to return to previous step.

Configuring the Control Valve for Use of an Outside Signal to Initiate Regeneration

Note: In a twin alternating softener, each control must have a separate dP signal or dP switch. One dP signal or one dP switch cannot be used for both controls.

Select the desired option in step 7CS. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board. Following is an explanation of the options:

- **oFF** – Feature not used.
- **on0** – If the dP switch is closed for an accumulative time of 2 minutes an immediate regeneration will be signaled to the unit. The MAV will transition first to switch units so the signaled unit can start regeneration. After the MAV has fully transitioned, the regeneration begins immediately. (If dP function “on0” is set, delayed rinse and fill feature will not be available.)
- **dELy** – If the dP switch is closed a regeneration will occur at the scheduled delayed regeneration time of day. Once the dP switch is triggered the PC Board will display REGEN TODAY and when the delayed regen time comes the control will switch tanks and the triggered unit will then go into regeneration. (If dP function “on0” is set, delayed rinse and fill feature will not be available.)
- **HoLd** – If the dP switch is closed a regeneration will be prevented from occurring while there is a switch closure. If the unit depletes the capacity down to zero, it will not be allowed to switch tanks to regenerate until the dP switch is open.



For MAV installation details and installation options, see “Motorized Alternating Valve (MAV) Service & Installation Details” section in the “Control Valve Service Instructions” section of this manual.

REGENERATION CYCLE TIME SETTINGS (PRE-PROGRAMMED TO FACTORY DEFAULTS)

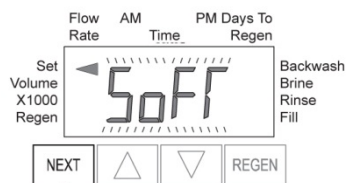
Step 1CT



Step 1CT

Press NEXT and ▼ simultaneously for 5 seconds and release. If screen in Step 2CT does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲ and ▼ simultaneously for 5 seconds and release.

Step 2CT



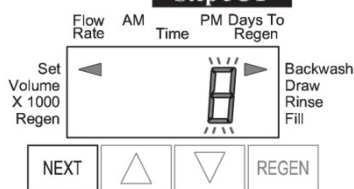
Step 2CT

Press ▲ or ▼ to select "Soft" (Softening) setting.

(Note: if "FILTERING" setting is accidentally selected, only screens 3CT & 6CT will appear – press REGEN to skip back to this screen and changing to SOFTENING.)

Press NEXT to go to Step 3CT. Press REGEN to return to previous step.

Step 3CT



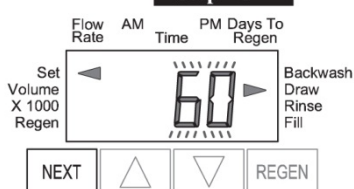
Step 3CT

Adjust the length of the backwash from 1 to 95 minutes using the ▲ and ▼ buttons.

Recommended: 8

Press NEXT to go to Step 4CT. Press REGEN to return to previous step.

Step 4CT



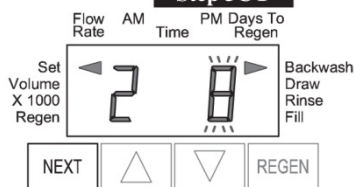
Step 4CT

Press ▲ or ▼ to adjust the length of the regenerant draw from 1 to 180 minutes.

Recommended: 60

Press NEXT to go to Step 5CT. Press REGEN to return to previous step.

Step 5CT



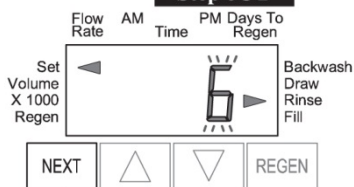
Step 5CT

Press ▲ or ▼ to adjust the length of the second backwash from 1 to 95 minutes.

Recommended: 8

Press NEXT to go to Step 6CT. Press REGEN to return to previous step.

Step 6CT



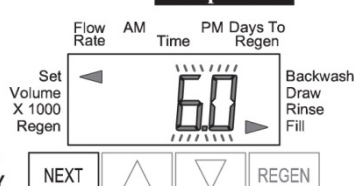
Step 6CT

Adjust the length of the rinse from 1 to 95 minutes using the ▲ and ▼ buttons.

Recommended: 4

Press NEXT to go to Step 7CT. Press REGEN to return to previous step.

Step 7CT



Step 7CT

Press ▲ or ▼ to adjust the length of the regenerant tank fill time from 0.1 to 99.9 minutes.

See Table 4 (page 15) for recommendations.

Press NEXT to go to exit Regeneration Cycle Times.

Press REGEN to return to previous step.

EXIT TO
DISPLAY
SCREENS

INSTALLER DISPLAYS AND SETTINGS FOR CONTROL VALVE OPTIONS

The below should be displayed when the valve is properly set up. If time-based regeneration menus are displayed, return to Configuration Settings Step 3CS to correct to volume initiated regeneration.

Step 1I

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 2500

Backwash Draw Rinse Fill

Step 2I

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 14

Backwash Draw Rinse Fill

Step 3I

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 200

Backwash Draw Rinse Fill

Step 4I

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 200

Backwash Draw Rinse Fill

Step 5I

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 200

Backwash Draw Rinse Fill

EXIT TO DISPLAY SCREENS

Volume Initiated (Demand) Regeneration Settings

Step 1I To enter Installer Display press NEXT and ▲ simultaneously for 5 seconds and release.

Step 2I
Press ▲ or ▼ to enter the volumetric capacity in gallons. (See Table 4 on page 15.)
Press NEXT to go to Step 3I. Press REGEN to return to previous step.

Step 3I
Press ▲ or ▼ to adjust the days override setting from 1 – 28 or OFF.
Press NEXT to go to Step 4I. Press REGEN to return to previous step.
Recommended: 12

Step 4I:
Regeneration time: Display should read “on 0”. If a time is displayed, return to configuration step 4CS to change to “on 0”
Press NEXT to go to step 5I. Press REGEN to return to previous step.

Step 5I
Press ▲ or ▼ to adjust the regeneration minutes.
Press NEXT to exit Installer Display Settings.
Press REGEN to return to previous step.

DIAGNOSTICS

Step 1D

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 5

Backwash Draw Rinse Fill

Step 2D

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 55

Backwash Draw Rinse Fill

Step 3D

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 765

Backwash Draw Rinse Fill

Step 4D

Flow Rate AM Time PM Days To Regen

Set Volume X 1000 Regen: 570

Backwash Draw Rinse Fill

EXIT TO DISPLAY SCREENS

Step 1D
Press ▲ and ▼ simultaneously for 5 seconds and release.
Then press ▲ and ▼ simultaneously for 3 seconds and release.
If screen in Step 2D does not appear, the lock on the valve is activated. To unlock press ▼, NEXT, REGEN, ▲ in sequence, then press ▲ and ▼ simultaneously for 5 seconds and release.

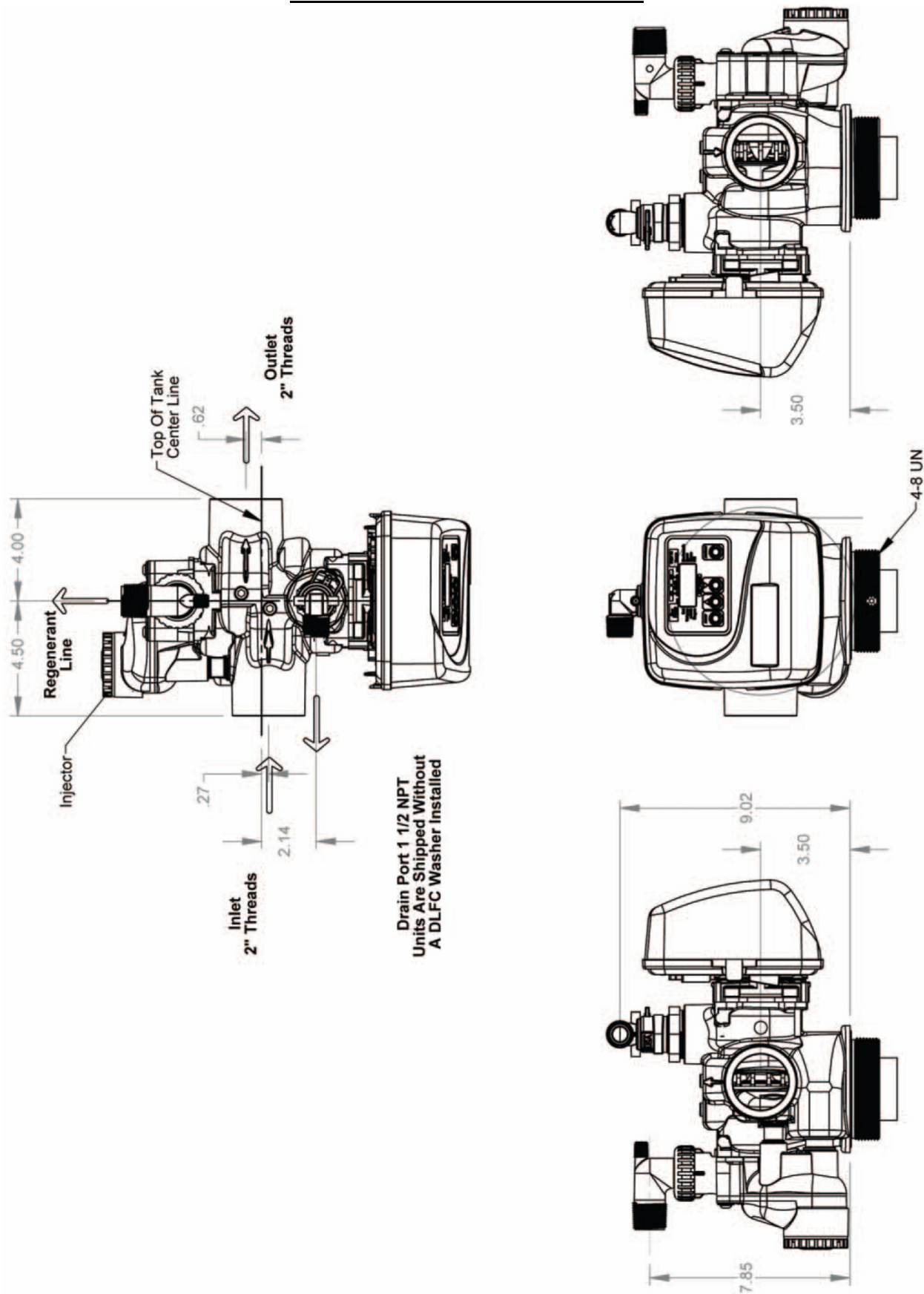
Step 2D
Display shows the number of days since a regeneration last occurred.
Press NEXT to go to next step. Press REGEN to exit Diagnostics.

Step 3D
Display shows the volume of water treated in gallons since the last regeneration.
Press NEXT to go to next step. Press REGEN to return to previous step.

Step 4D
Display shows the days in service since start up.
Press NEXT to go to next step. Press REGEN to return to previous step.

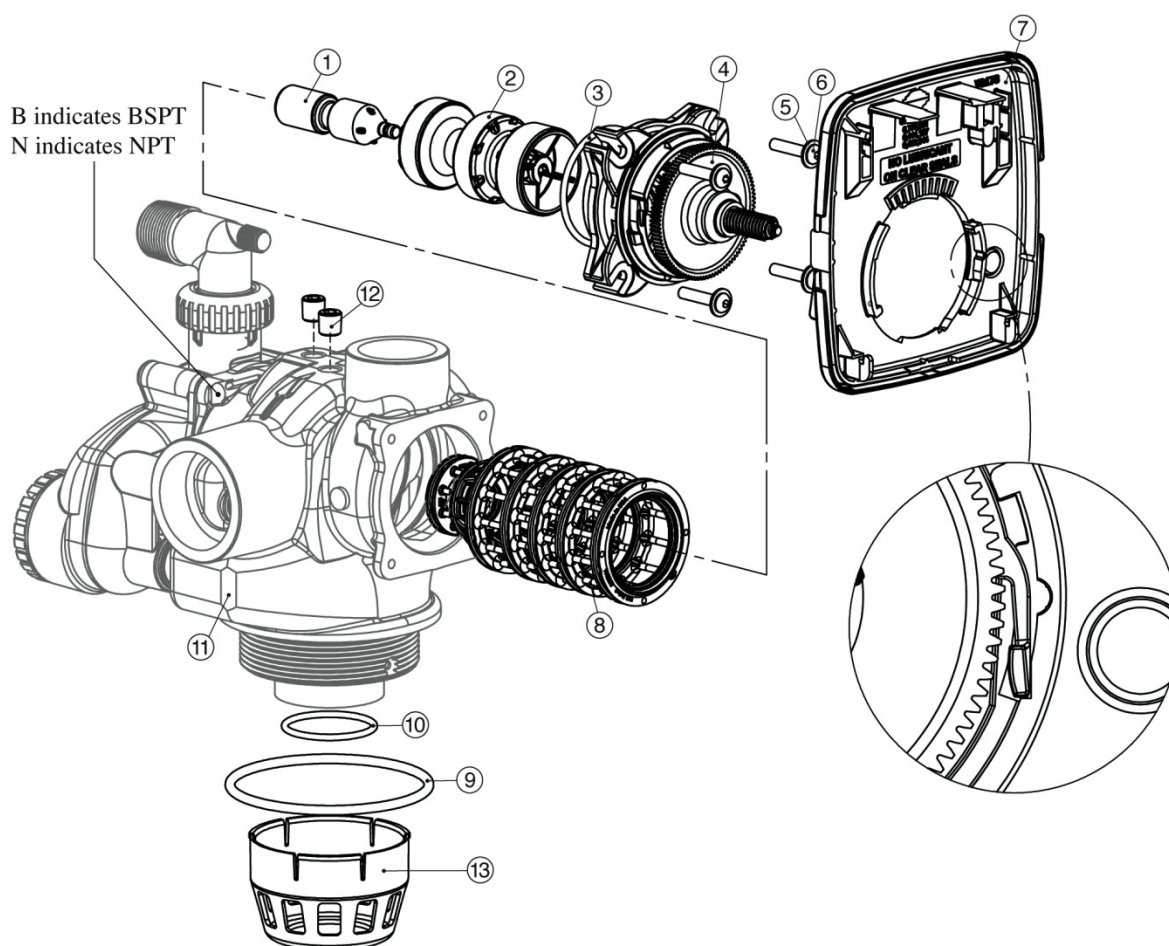
Step 5D
Display shows the total number of regeneration cycles since start up.
Press NEXT to exit Diagnostics. Press REGEN to return to previous step.

CV2 OVERVIEW DRAWINGS



CV2 DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, REGENERATE PISTON & SPACER STACK ASSEMBLY

Dwg. No.	Item No.	Description	Qty. Per Valve
1	V3726	Brine Piston Assembly	1
2	V3725	Piston Downflow Assembly	1
3	V3452	O-Ring 230	1
4	V3728	Drive Cap Assembly	1
5	V3724	Washer, Flat SS ¼	4
6	V3642	Bolt, BHCS, S/S ¼-20x1.25	4
7	BACK PLATE	Back Plate	1
8	V3729	Stack Assembly	1
9	V3419	O-Ring, 347	1
10	V3641	O-Ring, 225	1
11	V3700-01	WS2 Body NPT	1
12	V3468	WS2H Plug ¼ Hex NPT	2
13	D1300	Top Baffle DFRS 1.5/50MM	1

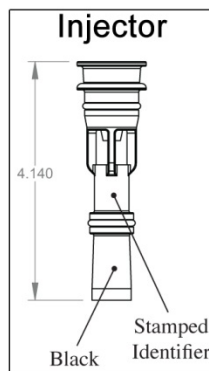
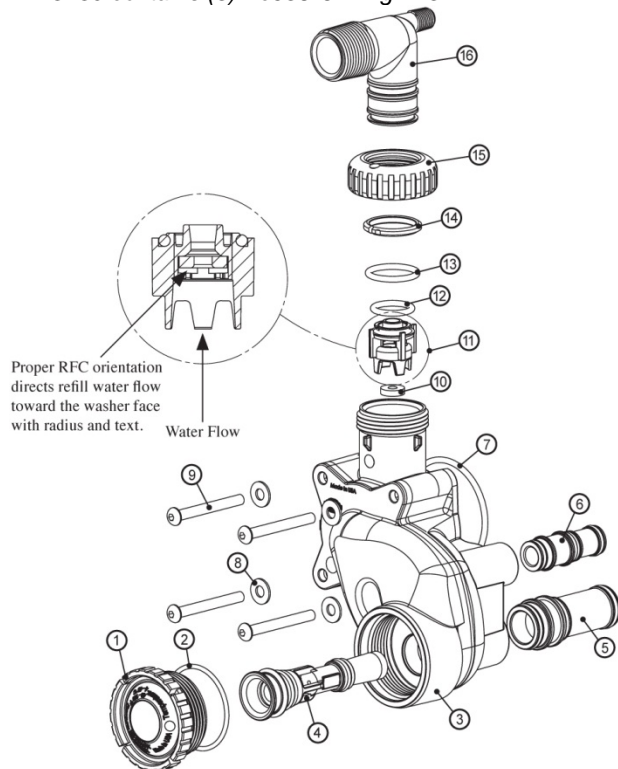


CV2 INJECTOR VALVE BODY, REFILL FLOW CONTROL AND INJECTOR PLUG

Dwg. No.	Item No.	Description	Qty. Per Valve
1	V3477	Injector Cap	1
2	V3152	O-Ring, 135	1
3	V3727	Injector Body Assembly	1
4	V3010-15Z	Injector Plug	1
5	V3731*	Injector Draw Tube Down Assembly	1
6	V3730**	Injector Feed Tube Down Assembly	1
7	V3315	O-Ring, 231	1
8	V3724	Washer, Flat SS ¼	4
9	V3643	Bolt BHCS S/S ¼-20x2.25	4
10	V3162-022	DLFC 022 for ¾	1
11	V3231	Refill Flow Control Retainer	1
12	V3277	O-Ring 211	1
13	V3105	O-Ring 215	1
14	V3150	Split Ring	1
15	V3151	Nut, 1" QC	1
16	V3149	Fitting, 1" PVC Male NPT Elbow	1
n/a	V3499	Fitting Cap 1" Threaded	1

*V3731 contains (1) D1262 O-Ring 118 and (2) V3639 O-Ring 119

** V3730 contains (3) Vc638 O-Ring 113



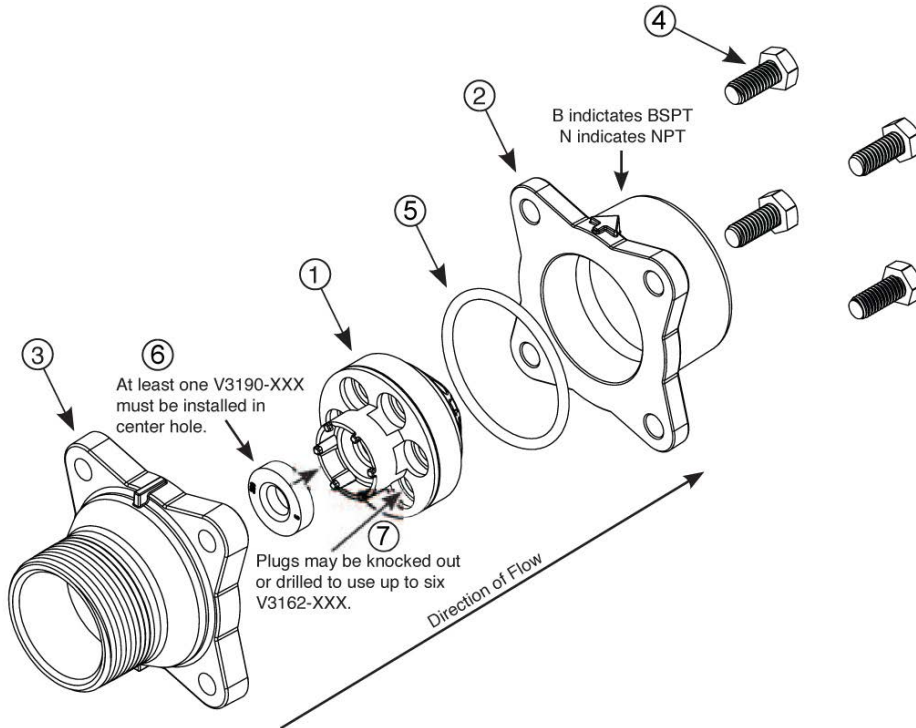
Injectors

Item No.	Stamped Identifier	Used on Model
V3010-2D	D	W-S3072EMT
V3010-2E	E	W-S3672EMT

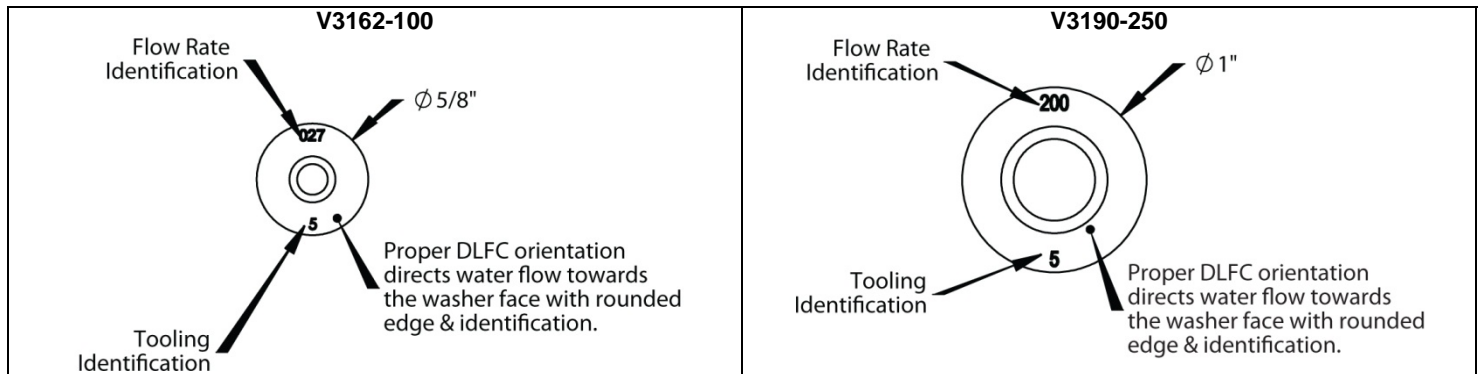
V3010-2D & V3010-2E include a V3283 O-Ring 117 and a V3284 O-Ring 114.

CV2 DRAIN LINE FLOW CONTROLS

Dwg. No.	Item No.	Description	Qty. Per Valve
1	V3081	DLFC Retainer Assembly	1
2	V3645	DLFC Flange Outlet, FNPT	1
3	V3646	DLFC Flange Inlet, MNPT	1
4	V3652	Bolt, Hex S/S HCS 5/16-18x3/4	4
5	V3441	O-Ring, 226	1
6	V3190-250	DLFC Washer, 1", 25 GPM	See Table Below
7	V3162-100	DLFC Washer, 5/8", 10 GPM	

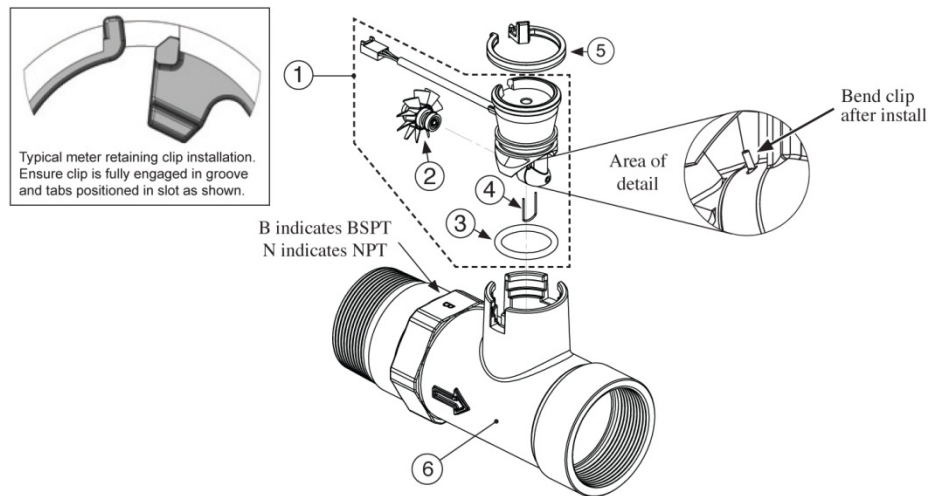


Filter Model	DLFC Washers	
	Part #	Qty.
W-S3072EMT	V3190-250	1
W-S3672EMT	V3190-250	1
	V3162-100	1



METER ASSEMBLY

Dwg. No.	Item No.	Description	Qty. Per Softener
1	V3003-02	Commercial meter assembly, 28" cable	1
2	V3118-03	Commercial meter turbine assembly	1
3	V3105	O-Ring, 215	1
4	V3501	Turbine clip	1
5	V3632*	Meter retaining clip	1
6	V3754-01	CV2 Meter housing (NPT)	1
Not Shown	V3488	CV2 flow straightener	1

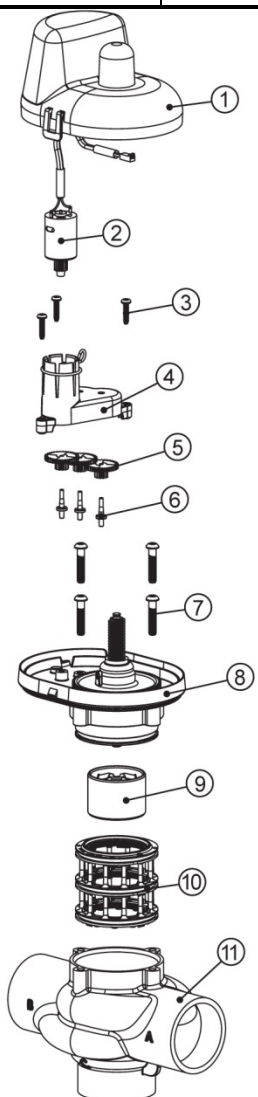


Complete Meter Assembly: V3094 (Includes 28" Cable)

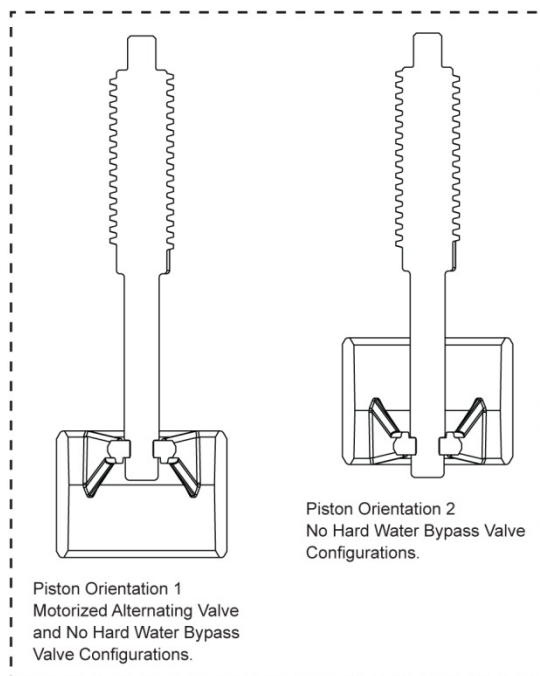
This water meter should not be used as the primary monitoring device for critical or health effect applications. Operating pressures: 20 psi minimum/ 125 psi maximum. Operating temperatures: 40°F Minimum/ 110°F Maximum

MOTORIZED ALTERNATING VALVE

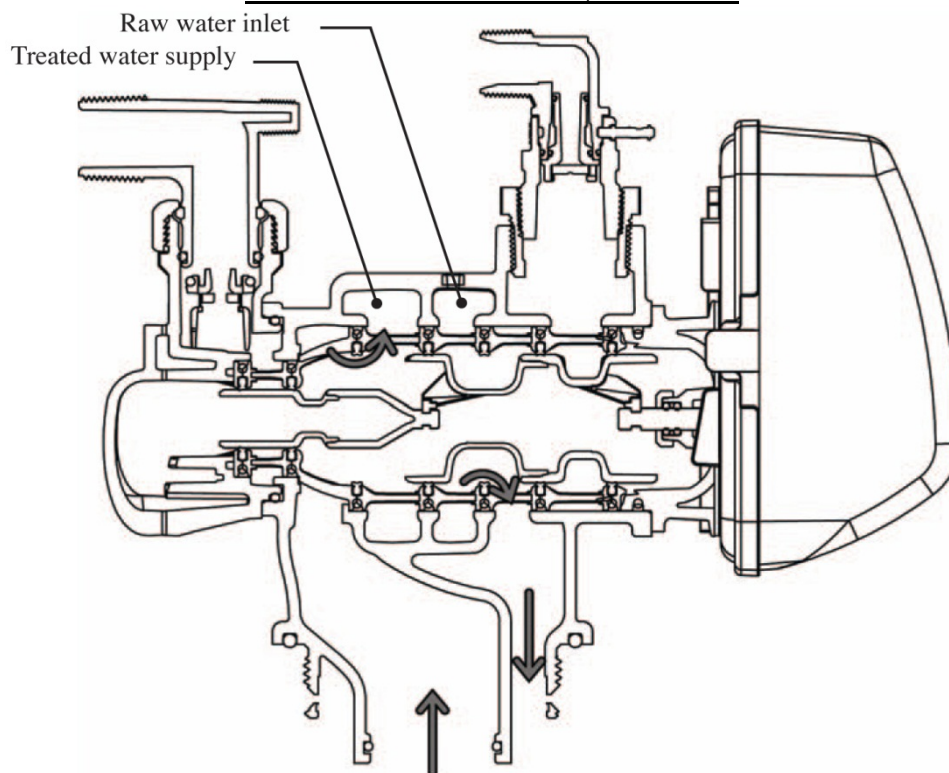
Dwg. No.	Item No.	Description	Qty. Per Softener
1	V3073	MAV/NOHWBY Cover Assembly	1
2	V3476	CV Motor Assembly, 8 ft	1
3	V3592	Screw, #8-3/4 PHPN T-25 SS	3
4	V3262-01	CV Reducing Gear Cover Assembly	1
5	V3110	Drive Reducing Gear 12x36	3
6	V3264	Bypass Reduction Gear Axle	3
7	V3642	Screw 1/4-20 x 1 1/4 BHSCS SS (5/32" Hex Allen Wrench Required)	4
8	V3078	MAV/NOHWBY 2 Drive Assy	1
9	V3634-01	MAV/NOHWBY 2 Piston	1
10	V3077	MAV/NOHWBY 2 Stack Assy	1
11	V3633-01	MAV Body, 2", NPT	1
Not Shown	V3474	WS Alt Connect Cord 8ft, Black	1



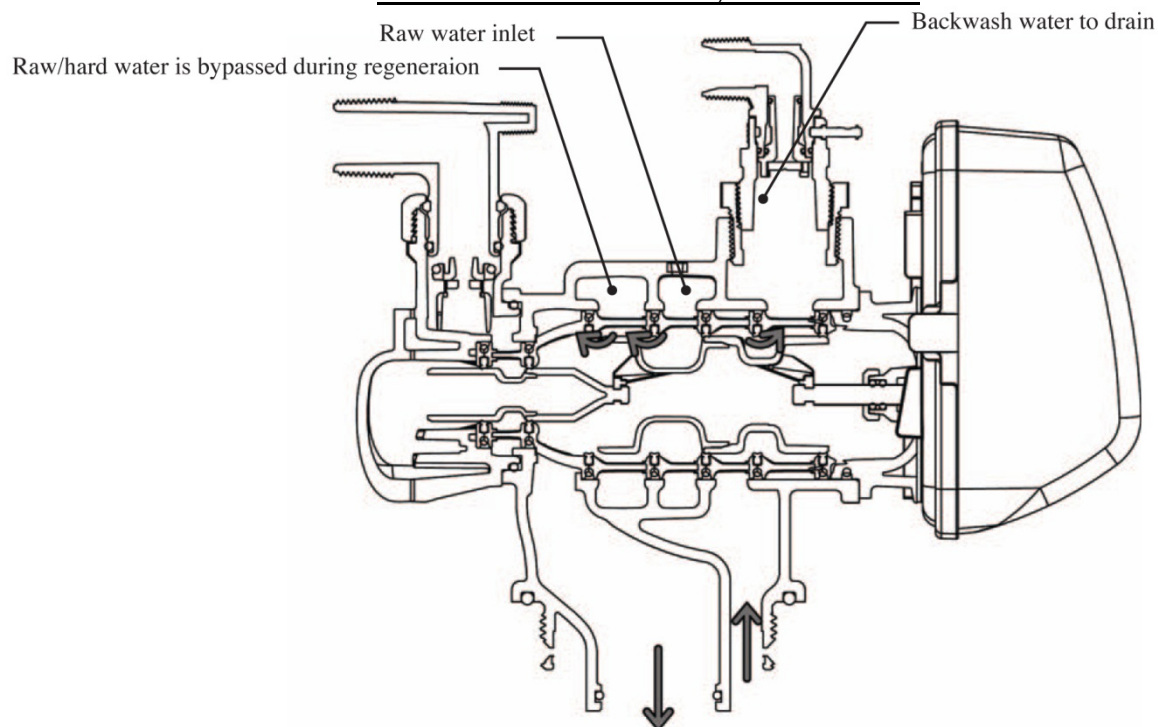
•Operating Pressures:
20 PSI Minimum / 125 PSI Maximum
•Operating Temperatures:
40°F Minimum / 110°F Maximum



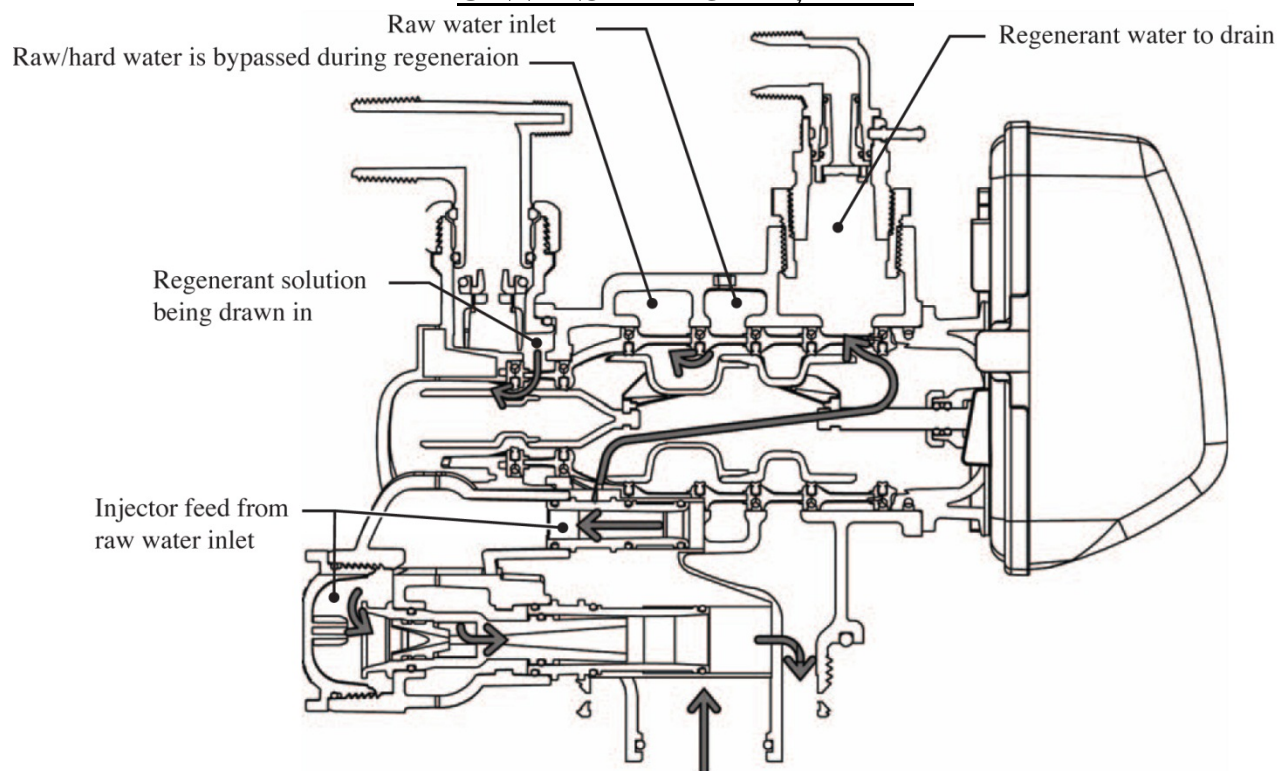
CV2 FLOW DIAGRAM, SERVICE



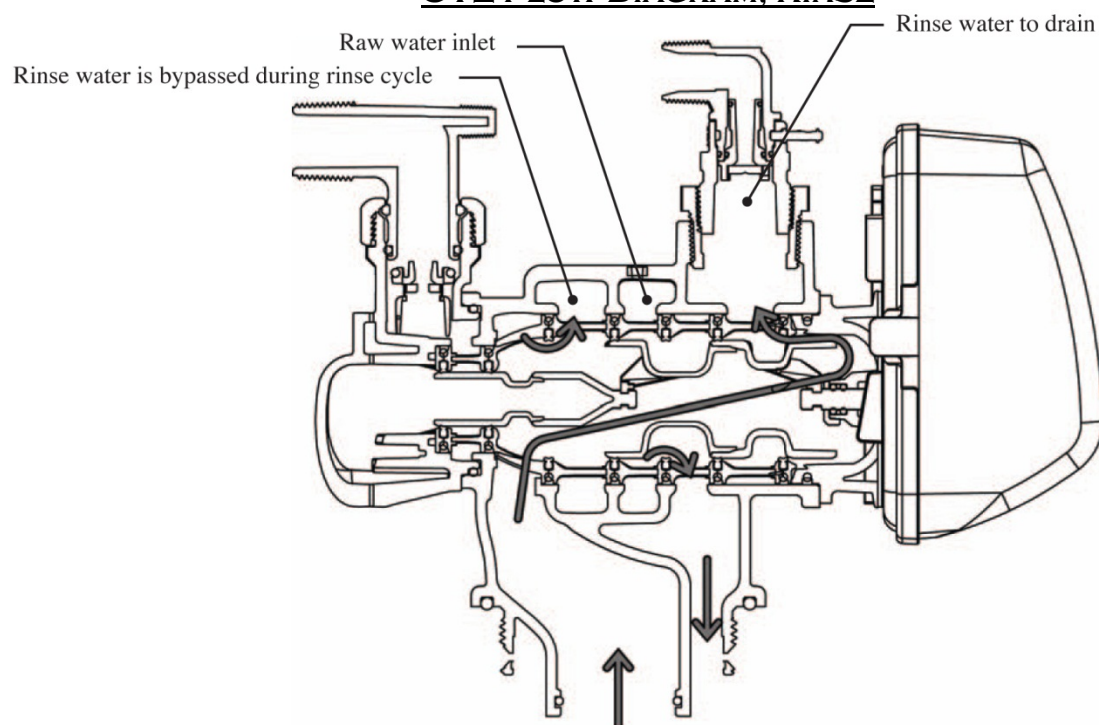
CV2 FLOW DIAGRAM, BACKWASH



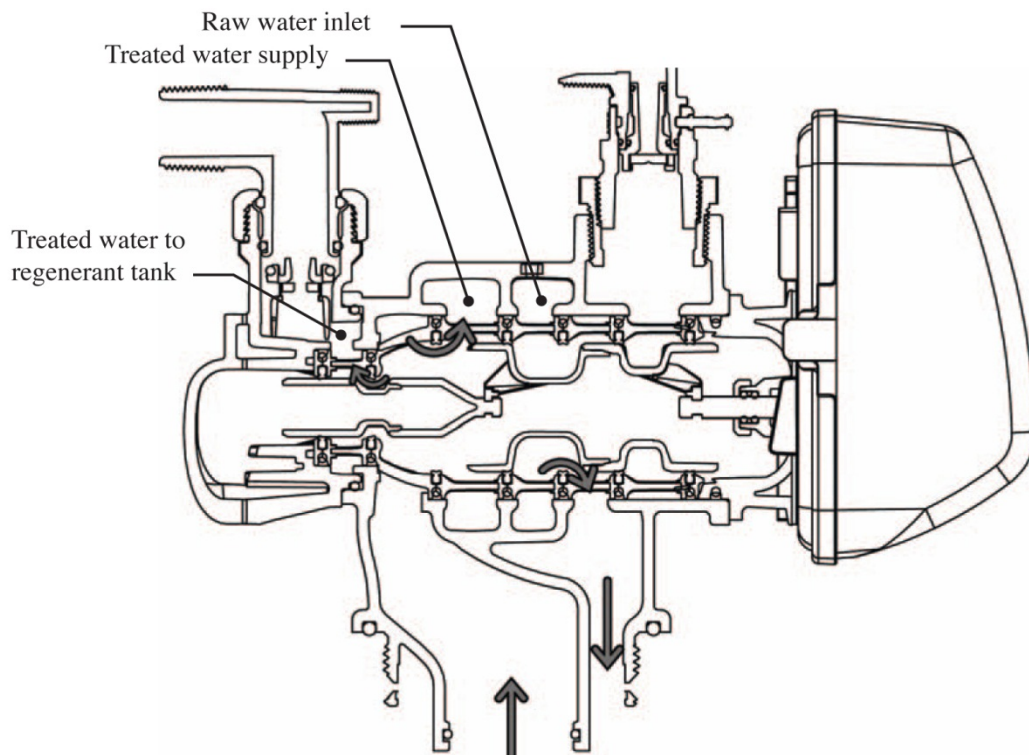
CV2 FLOW DIAGRAM, DRAW



CV2 FLOW DIAGRAM, RINSE



CV2 FLOW DIAGRAM, TREATED WATER REFILL

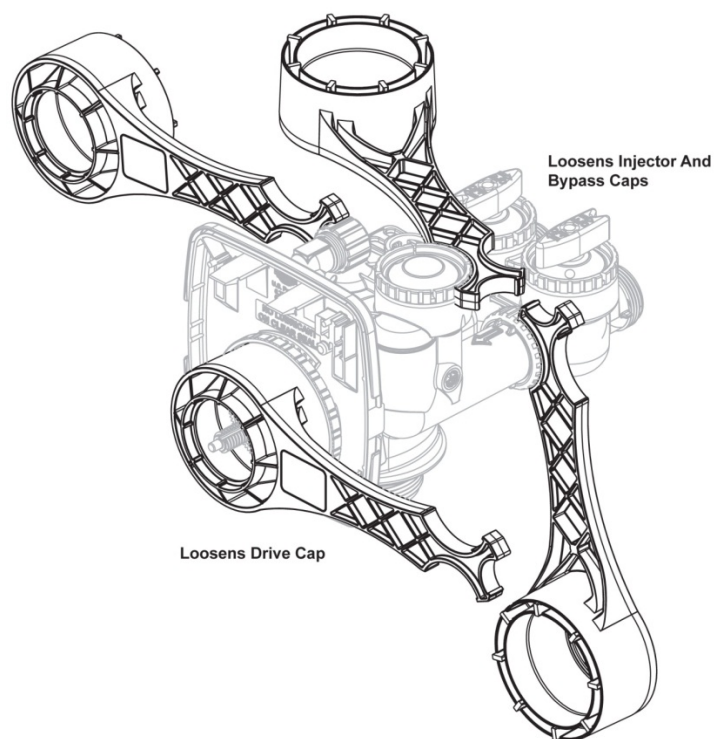


SERVICE SPANNER WRENCH

Model No: V3193-02 (Sold Separately)

Although no tools are necessary to assemble or disassemble the valve, the CV1 wrench (shown below in various positions on the valve) may be purchased separately to aid in assembly or disassembly of the control valve.

Figure 1



CONTROL VALVE SERVICE INSTRUCTIONS

DRIVE ASSEMBLY

Disassembly and Inspection: The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. Disconnect the power source plug (4 pin, black cable) from the PC board prior to disconnecting any other plugs from the PC board. Disconnect and MAV/ AUX drive motors (2 pin, black cable) from the PC board. Disconnect the water meter plug (3 pin, grey cable), located on the far right side of the PC board. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket towards your body. The lower edge of the drive bracket has two notches that rest on the drive back plate. Lift up and outward on the drive bracket to disengage the notches.

To inspect the drive reduction gears, the drive gear cover needs to be removed. The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. With the PC board facing up, push in and down on the large clip on the drive gear cover. Handle the cover and the gears carefully so that the gears do not fall off of the pegs in the cover. Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting.

The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor, disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a ¼ turn in either direction before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor. Visually inspect the motor for free spinning and remaining brush life (visible through slots on the size of the motor). Check the pinion gear for endplay. If the pinion gear is pushed tight against the motor housing, eliminating endplay, slide it away from the housing so the end of the shaft is flush with the end of the gear.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

Reassembly: If the drive gear cover was removed, reinstall it with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

To reinstall the drive bracket, seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket towards the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket slightly to the left by pressing on the side of the upper right corner. This helps the drive gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drive bracket and drive back plate, or the gear is not engaging the drive cap assembly.

Replace the motor if necessary. Do not lubricate the motor or the gears. To reinstall the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. Release the spring clip loop and continue to rotate the motor until the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the lower left hand side of the PC board. If the motor will not easily engage with the drive gear when reinstalling, lift and slightly rotate the motor before reinserting. Reconnect the power plug.

Replace the valve cover. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

DRIVE CAP ASSEMBLY

Disassembly: After removing the bracket assembly the drive back plate can be removed by squeezing the 2 locking tabs (located at 3 and 9 o'clock around the white gear) and rotating the back plate counter clockwise. The four 1/4-20 screws can then be removed and the drive cap pulled straight back out of the valve. Turning the main gear counter clockwise drives the piston in and may aid in pushing out the cap.

Inspection: The drive cap assembly contains the drive cap, the main drive gear, drive cap spline, piston rod and various other parts that should not be disassembled in the field. Visually inspect the drive cap for damage and free operation of the gear and threaded rod. The only replaceable part on the drive cap assembly is the o-ring.

MAIN PISTON AND REGENERANT PISTON

Disassembly and Inspection: Attached to the drive cap assembly are the main downflow piston and the regenerant piston. The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by unsnapping it from its disassembly latch. To remove the main piston, fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean the piston in dilute sodium bisulfite or vinegar, or replace it. The main piston is Teflon coated. If the teflon coating is abraded, replace the main piston.

Reassembly: Reattach the main piston to the drive cap assembly. Reattach the regenerant piston to the main piston. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly until the backside of the drive cap bottoms out and is flush with the casting or the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (4 pin, black cable) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

SPACER STACK ASSEMBLY

Disassembly and Inspection: To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can then be pulled straight out. Inspect the black o-rings and inner seals for wear or damage; replace the entire stack if necessary. Do not disassemble the stack. The spacer stack assembly may be chemically cleaned (in dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

Reassembly: The spacer stack assembly can be pushed into the control valve body bore by hand. The assembly is properly seated when at least four threads are exposed (approximately 5/8"). Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack.

Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (4 pin, black cable) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

INJECTOR CAP, SCREEN, AND INJECTOR

Disassembly and Inspection: The injector can be accessed at the back of the valve by removing the threaded injector cap. The cap is removed by using the V3193-02 service wrench (Figure 1). Once the cap is removed, use the open end of the V3193-01 service wrench at an angle to pry out the injector. An injector consists of a throat and nozzle. It can be chemically cleaned with vinegar or dilute sodium bisulfate. The holes can be blown out by air. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the injector hole could change the operating parameters of the injector.

Reassembly: Press the injector into its bore hole and press until seated all the way down. Replace the injector cap.

REFILL FLOW CONTROL ASSEMBLY

Disassembly and Inspection: To clean or replace the refill flow control, remove the nut and then pull the fitting straight out. Remove the flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small blade flat screwdriver, being careful not to mar the plastic seat.

Chemically clean the flow control or the flow control retainer using dilute sodium bisulfite or vinegar. **Do not clean with abrasive methods.** If necessary, replace the flow control or o-rings.

Reassembly: Insert the flow control into its seat, confirming correct flow control orientation. Reseat the flow control retainer and reassemble the fitting (see diagram in the exploded view section). Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring on the elbow or the retainer, but not on the flow control or its seat.

DRAIN LINE FLOW CONTROL

Disassembly and Inspection: Depending on the flow control installed on the unit, remove the red plastic retaining clip (plastic flow control) or the (4) screws (stainless steel flow control) to expose the flow control and retainer. The flow controls can be removed by flexing the washer with a small screwdriver being careful not to mar the plastic seat. The flow control and retainer may be chemically cleaned using dilute sodium bisulfite or vinegar, do not clean with abrasive methods.

Reassembly: Insert the flow washers back into their respective bores, confirming correct flow control orientation (see diagram in the exploded view section). Place back into the housing and reassemble the housing /fitting. Do not use Vaseline, oils or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring of the elbow or the retainer, but not on the flow control or its seat.

METER ASSEMBLY SERVICE INSTRUCTIONS

Service or replace turbine by:

- Turn the bypass for the system on and relieve the pressure on the system before removing the meter.
- Press downward on the remote meter assembly to relieve tension on the retaining clip. Remove the clip and take the meter assembly out of the housing.
- Remove the bend from the two exposed tips of the retaining clip and remove clip.
- Service or replace the turbine assembly and place it back on the turbine shaft.
- Insert the turbine clip and re-bend the exposed ends of the clip. The turbine has a groove to line up with the turbine clip.
- Insert meter assembly back into the meter housing.
- Reinstall the meter retaining clip.
- Open the bypass for the system slowly to bring back into service and check to be sure you have no water leaks.

MOTORIZED ALTERNATING VALVE (MAV) SERVICE & INSTALLATION DETAILS

Service or Installation of Motor: Do not lubricate the motor or the gears. To install the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. If the motor will not easily engage with the drive gears when reinstalling, lift and slightly rotate the motor before reinserting. Release the spring clip loop and continue to rotate the motor until the wires are horizontal and the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the board labeled drive.

Up to 2 additional cables can be brought through the back plate. Locate the round strain relief knock-out on the inside of the back plate. Use a punch and hammer to remove the knock-out. One or both tabs at the bottom of the strain relief feature may be broken out with needle-nose pliers. The additional cables may be brought through the knock-out hole, and connected to the PC board. After the cables are connected to the PC board, weave the cables through the strain relief feature, and then use V3805 Strain Relief Cover Kit to cover the cables in the strain relief. To help prevent damage to the cables, allow nearby solder joints to cool or solvent cement joints to cure.

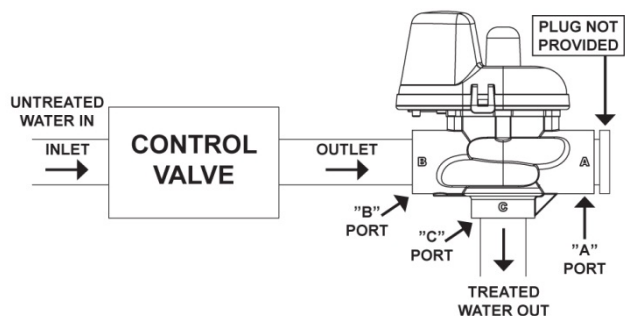
- For twin tank operation, the 8' interconnect cable must be threaded through the back plates and connected to the three pin connector labeled INTERCONNECT CABLE on both the ALT A and ALT b control valves. The 8' interconnect cable is not used for No Hard Water Bypass (NHWB) or Separate Source (SEPS) operation.

NOTE: It is possible to use the Motorized Alternating Valve on controls with individual meters with some International or Custom PC Boards. When using the Motorized Alternating Valve with two meters, it is necessary to disconnect or cut the left wire on the interconnect cable. This is the wire closest to the center cut out on the PC Board.

- The 8' alternator valve motor cable must be threaded through the back plate and connected to the two pin connector labeled DRIVE on the control valve board (for twin tank operation connect to the unit set as ALT A).
- The 15' water meter cable must be threaded through the back plate and connected to the three pin connection labeled METER on the control valve board. **NOTE:** A meter must be used for twin tank operation; meters are recommended but not required for NHWB or SEPS operation. If using the Motorized Alternating Valve with a meter on each control, it is necessary to connect each meter to the PC Board.
- The 15' AC Adapter or power cable must be thread through the back plate of all control valves. The AC adapter should be installed to a properly grounded (not switched) outlet.

No Hard Water Bypass:

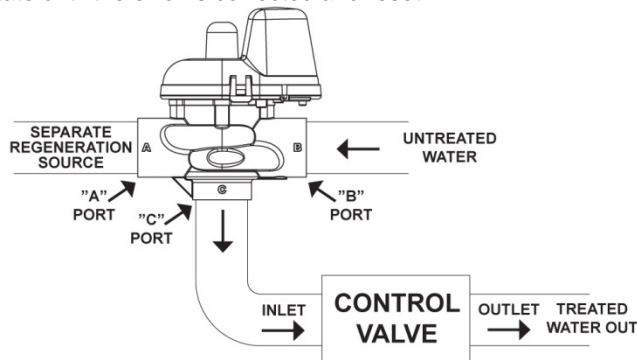
The MAV will be driven closed before the first regeneration cycle that is not FILL or SOFTENING or FILTERING, and be driven open after the last regeneration cycle that is not FILL. If the control valve enters into an error state during regeneration mode, the MAV will remain in its current state until the error is corrected and reset.



Caution: No Hard Water Bypass installation prevents water from entering the downstream plumbing. If a downstream plumbing device or local code requires an uninterrupted water supply, design the installations to accommodate.

Separate Source Regeneration:

The MAV will be driven closed (i.e. let water flow from A port to C port) before the first regeneration cycle, and be driven open (i.e. let water flow from B port to C port) after the last regeneration cycle. If the control valve enters into an error during regeneration mode, the MAV will remain in its current state until the error is corrected and reset.



Note: If there is a treated water demand during regeneration, separate source water will be used.

MAINTENANCE – REMOVAL & REPLACEMENT OF SOFTENING RESIN

Tools Needed:

- Wrench (to removing piping)
 - Screwdriver wide blade
 - Buckets (for materials)
 - Wet and Dry Vacuum Cleaner or Tarp
1. Turn off water to the softener.
 2. Relieve pressure in tank by either opening a downstream valve or cycling the control valve into the back wash position.
 3. If a by-pass valve is installed, place it in the by-pass position.
 4. Disconnect drain line.
 5. Turn off electrical source and disconnect control valve. Remove any wiring connected to control valve.
 6. Loosen plumbing from control valve.
 7. Carefully move softener forward until it clears plumbing.
 8. Move softener to an area where access is available to all sides.
 9. Carefully loosen control valve on mineral tank top. Slowly unscrew valve being careful not to damage threads in top of tank.
 10. When valve is loose from top of tank, slowly twist it back and forth to remove it from top of distributor tube inside tank.
 11. To remove softening resin from the mineral tank choose one of the recommended methods below:
 - a. **Vacuum Removal:** Vacuum all material out of tank and then wash inside with clean water.
 - b. **Manual Removal:** Place a canvas on floor to catch softening resin and other materials dumped from mineral tank. Lay tank on its side and tip it up to dump softening resin and other materials out of tank. Slowly rotate tank as it is being dumped. When all material is out of tank wash it with clean water.

Note: <i>Dispose of the softening resin & under-bedding by local procedures or laws.</i>

12. Replace under-bedding and softener resin as per media loading instructions.
13. Perform start-up procedure.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Inlet pressure low	Low supply pressure	Correct incoming supply pressure
	Low flow from source	Remove blockage or other restrictions
Treated water flow low	Media/Resin bed fouled	Backwash Filter
	Valves closed	Check valves and fully open
Untreated water is being delivered	Bypass valve is open or faulty	Fully close bypass valve or replace
	Media is exhausted due to high water usage	Check program settings or diagnostics for abnormal water usage
	Water quality fluctuation	Test water and adjust program values accordingly
	No salt or low level of salt in regenerant tank.	Add salt to the regenerant tank.
	Control fails to draw in regenerant.	Refer to <i>Control Fails to Draw in Regenerant</i> section of this guide.
	Insufficient regenerant level in regenerant tank.	Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace.
	Damaged seal/stack assembly	Replace seal/stack assembly
	Control valve body type and piston type mismatched	Verify proper control valve body type and piston type match
	Fouled media bed	Replace media bed
No Display on PC Board	No Power at electrical outlet	Repair outlet or use working outlet
	Control Valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	Plug Power Adapter into outlet or connect power cord end to PC Board connection
	Improper Power Supply	Verify power voltage is being delivered to the PC Board
	Defective Power Adapter	Replace Power Adapter
	Defective PC Board	Replace PC Board
PC Board does not display correct time of day	Power Adapter plugged into electric outlet controlled by light switch	Use uninterrupted outlet
	Tripped breaker switch and/or tripped GFI	Reset breaker switch and/ or GFI switch
	Power outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	Defective PC Board	Replace PC Board
Display does not indicate that water is flowing.	Bypass valve in bypass position	Place bypass in service position.
	Meter is not connected to meter connection on PC board or is not installed securely	Connect meter three pin connection labeled METER on the PC board. Verify meter cable is securely onto three pin connection.
	Restricted/Stalled turbine	Remove meter and check for rotation or foreign material
	Defective meter	Replace meter
	Defective PC board	Replace PC board

PROBLEM	POSSIBLE CAUSE	SOLUTION
Control valve regenerates at wrong time of day	Power outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	Time of day not set correctly	Reset to correct time of day
	Time of regeneration set incorrectly	Reset regeneration time
Time of day flashes on and off	Power Outage	Reset time of day. If PC Board has battery backup present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
Control valve does not regenerate automatically when the ▲&▼ buttons are depressed and held	Broken drive gear or drive cap assembly	Replace drive gear or drive cap assembly
	Broken Piston Rod	Replace Piston Rod
	Defective PC Board	Replace PC Board
Control valve does not regenerate automatically but does when the ▲&▼ buttons are depressed and held	Bypass valve in bypass position	Turn bypass handles to place bypass in service position
	Defective PC Board	Replace PC Board
Control valve uses too much regenerant	Improper program settings	Check program setting to make sure they are specific to the water quality and application needs
Residual regenerant being delivered to service	Low water pressure	Check incoming water pressure – water pressure must remain at minimum of 25 psi
	Incorrect injector size	Replace injector with correct size for the application
	Restricted drain line	Check drain line for restrictions or debris and clean
Excessive water in regenerant tank	Improper program setting	Check refill setting
	Plugged Injector	Remove injector and clean or replace
	Drive cap assembly not tightened in properly	Re-tighten the drive cap assembly
	Damaged seal/ stack assembly	Replace stack/seal
	Restricted or kinked drain line	Check drain line for restrictions or debris and/or un-kink drain line
	Plugged backwash flow controller	Remove backwash flow controller and clean or replace
	Missing refill flow controller	Replace refill controller
Control valve fails to draw in regenerant	Injector is plugged	Remove injector and clean or replace
	Faulty regenerant piston	Replace regenerant piston
	Regenerant line connection leak	Inspect regenerate line for air leak
	Drain line restriction or debris cause excess back pressure	Inspect drain line and clean to correct restriction
	Drain line too long or too high	Shorten length and/or height
	Low water pressure	Check incoming water pressure – water pressure must remain at minimum of 25 psi
Water running to drain	Power outage during regeneration	Upon power being restored control will finish the remaining regeneration time. Reset time of day.
	Damaged seal/stack assembly	Replace seal/sack assembly
	Piston assembly failure	Replace piston assembly
	Drive cap assembly not tightened in properly	Re-tighten the drive cap assembly

PROBLEM	POSSIBLE CAUSE	SOLUTION
Err 1001 Error Message: Control unable to sense motor movement	Motor not inserted full to engage pinion, motor wires broken or disconnected	Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	PC Board not properly snapped into drive bracket	Properly snap PC Board into drive bracket. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Missing reduction gears	Replace missing gears
Err 1002 Error Message: Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign material is lodged in control valve	Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Mechanical binding	Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Main drive gear too tight	Loosen main drive gear. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Improper voltage being delivered to PC Board	Verify that proper voltage is being supplied. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
Err 1003 Error Message: Control valve motor ran too long and was unable to find the next cycle position	Motor failure during a regeneration	Check motor connections. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	Replace piston and stack assemblies. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
Err 1004 Error Message: Control valve motor ran too long and timed out trying to reach home position	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly. Press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in to reset the valve.
Err 1006 Error Message: MAV (Motorized Alternating Valve) motor ran too long and unable to find the proper park position	MAV motor wire not connected to the PC board	Connect MAV motor to PC board two-pin connection labeled DRIVE. Press and hold NEXT and REGEN buttons for 3 seconds to resynchronize software with the piston position or disconnect the power supply from the PC board for 5 seconds then reconnect.
	MAV motor not fully engaged with reduction gears	Properly insert motor into the casing, do not force casing. Press and hold NEXT and REGEN buttons for 3 seconds to resynchronize software with the piston position or disconnect the power supply from the PC board for 5 seconds then reconnect.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out the motor	Replace piston stack and assemblies. Press and hold NEXT and REGEN buttons for 3 seconds to resynchronize software with the piston position or disconnect the power supply from the PC board for 5 seconds then reconnect.
Err 1007 Error Message: MAV motor ran too short (stalled) while looking for proper park position.	Foreign matter is lodged in MAV	Open the MAV and check piston and seal/stack assembly for foreign material. Press and hold NEXT and REGEN buttons for 3 seconds to resynchronize software with the piston position or disconnect the power supply from the PC board for 5 seconds then reconnect.
	Mechanical binding	Check piston and seal/stack assembly, check reduction gears, drive gear interface, and check MAV black drive pinion on motor for being jammed into motor body.

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[illegible]

[illegible]

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- Three (3) months following date of shipment from Vista.

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